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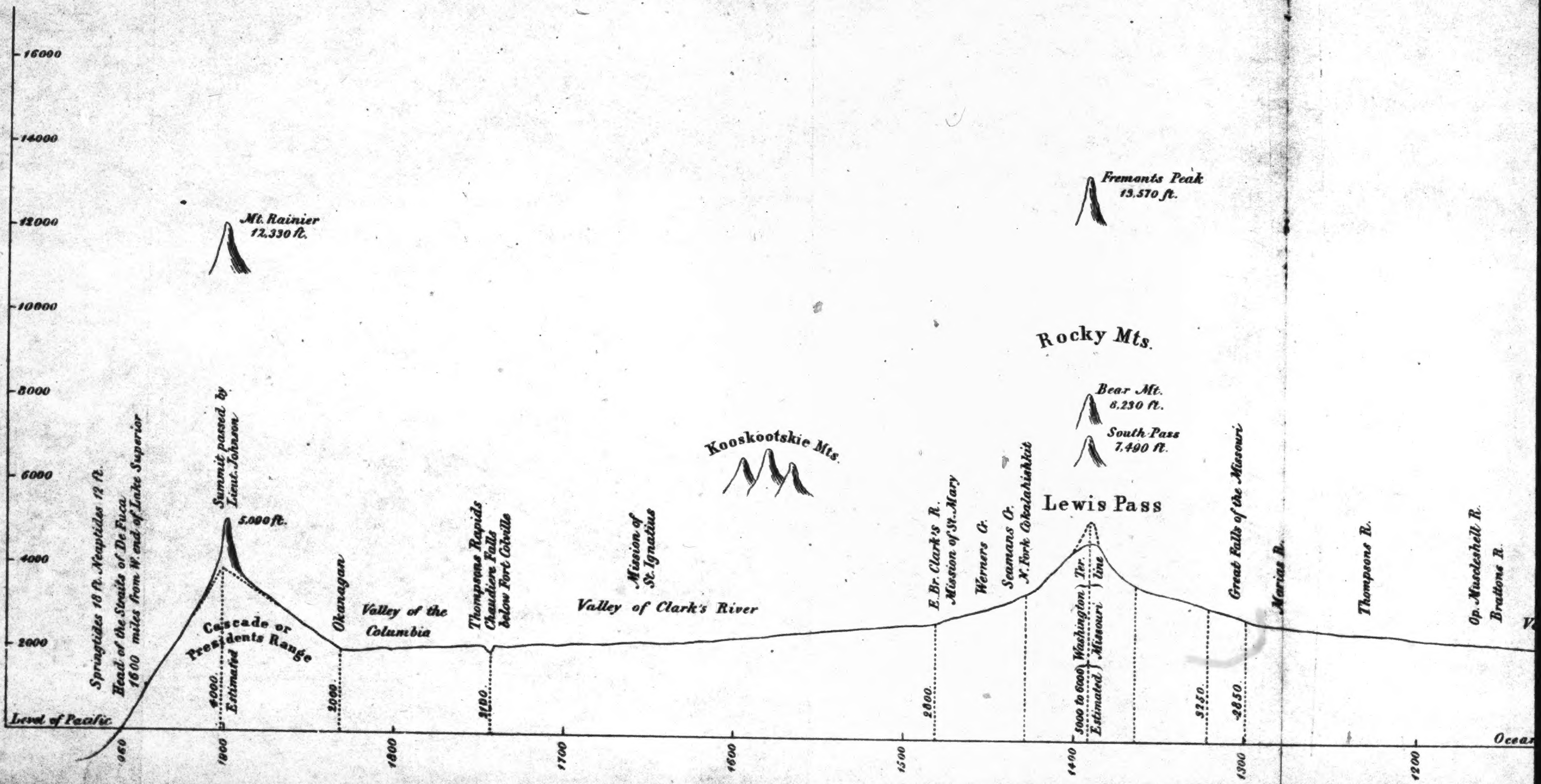
16000
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Level of Pacific
Mt. Rainier 12,330 ft.
Fremonts Peak 13,570 ft.
Rocky Mts.
Bear Mt. 8,230 ft.
South Pass 7,490 ft.
Kooskootskie Mts.
Lewis Pass
Springtides 18 ft. Neaptides 12 ft.
Head of the Straits of De Fuca
1600 miles from W. end of Lake Superior
Summit passed by Lieut. Johnson
5,000 ft.
Cascade or Presidents Range
4000. Estimated
Okanagan
2000.
Valley of the Columbia
Thompsons Rapids
Chaudiere Falls
below Fort Colville
2100.
Mission of St. Ignatius
Valley of Clark's River
E. Br. Clark's R.
Mission of St. Mary
2800.
Werners Cr.
Seamans Cr.
N. Fork Cokalahishkit
5000 to 6000 Estimated
Washington Ter.
Missouri line
3250.
2850.
Great Falls of the Missouri
Marias R.
Thompsons R.
Op. Muscleshell R.
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960
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PROFILE

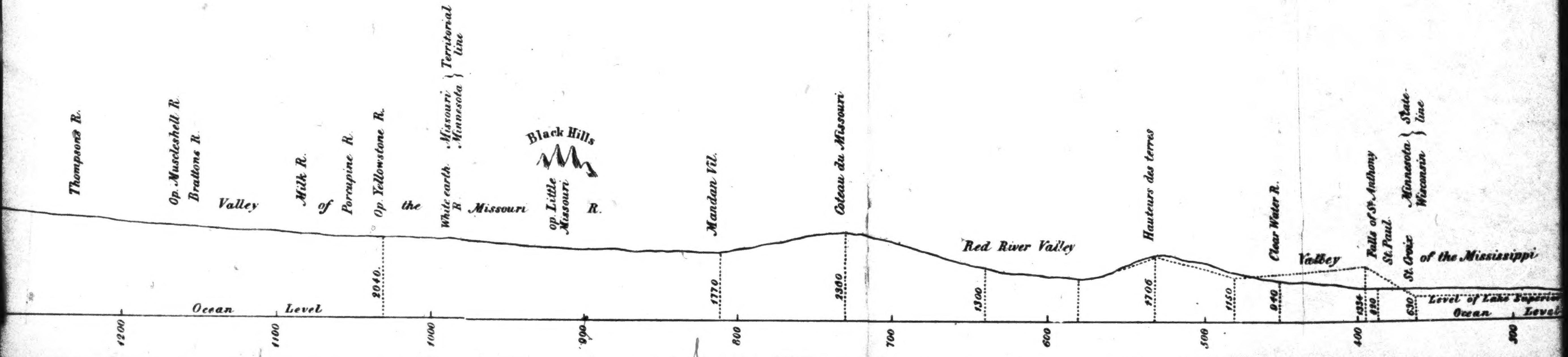
Shewing the general features of the Route of the proposed

Railroad to the Pacific,

from **Chicago, Ill.**, to the Straits of **Juan De Fuca** via the
Valley of the Upper Missouri;

and its connection with Lake Superior.

Augt 1853. *by E. F. Johnson, C.E.*



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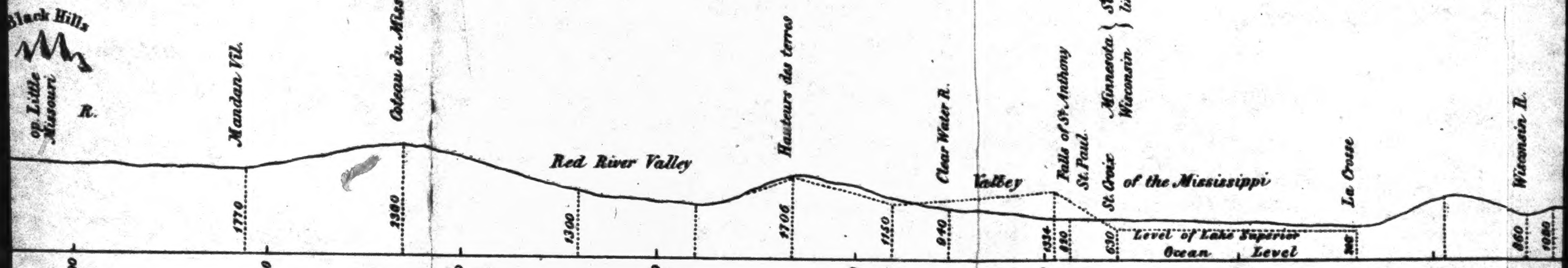

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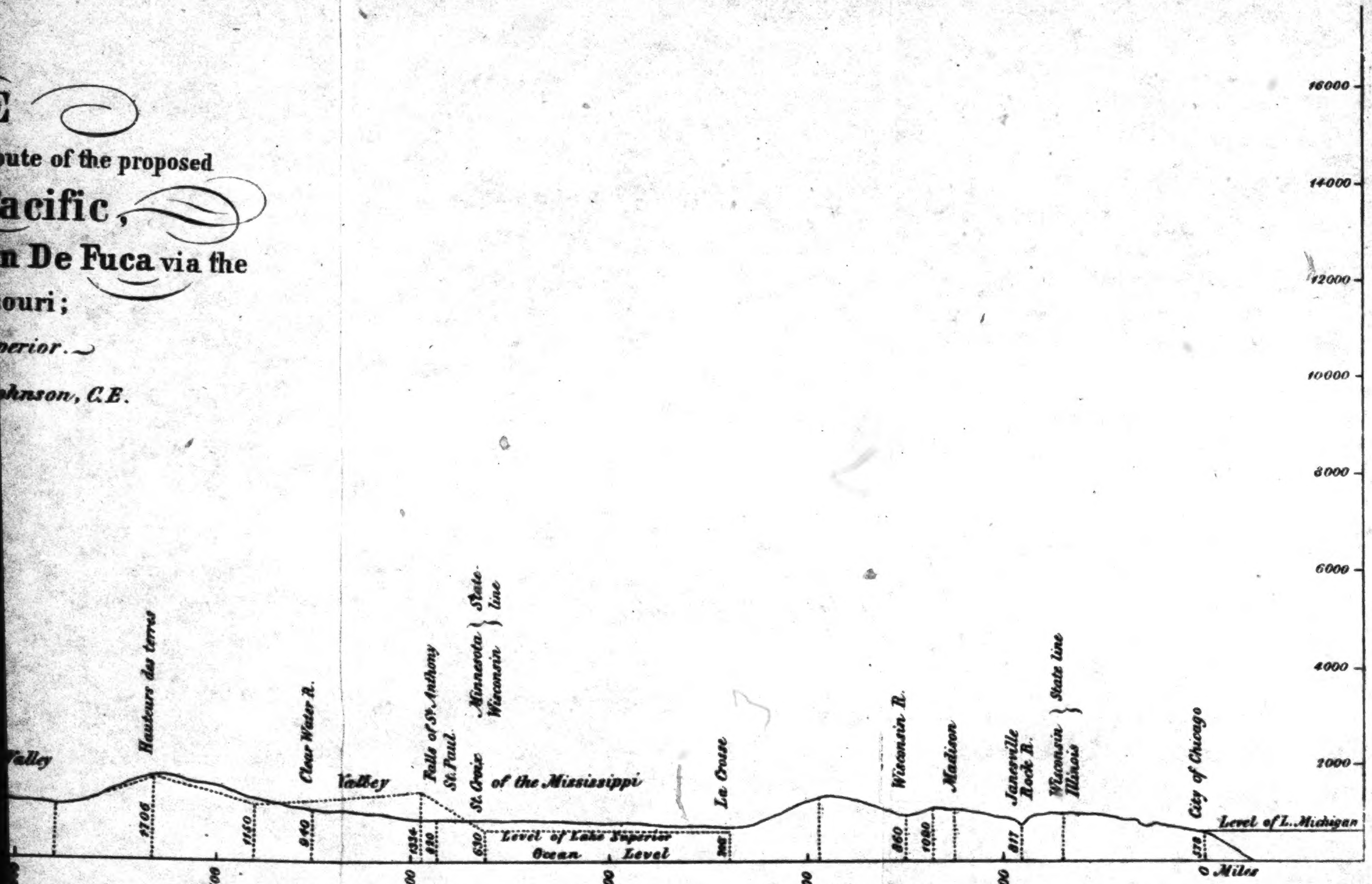

RAILROAD TO THE PACIFIC.

NORTHERN ROUTE.

ITS GENERAL CHARACTER,

RELATIVE MERITS, ETC.

BY

EDWIN F. JOHNSON, C. E.

SECOND EDITION.

NEW YORK:
RAILROAD JOURNAL JOB PRINTING OFFICE, 122 NASSAU STREET.
1854.

Entered according to Act of Congress in the year 1853,
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in the Clerk's Office of the District Court of Connecticut.

INTRODUCTION.

It will, doubtless, be deemed presumptuous by many, in view of the fact, that surveys are now in progress for determining the relative merits of the several routes proposed for the Pacific Railroad, that any one should attempt, in anticipation of the results of those surveys, an investigation of the subject, for the purpose of submitting the same to the public.

It is only from a firm conviction that the evidence already possessed is sufficient to bring the mind to a very correct conclusion, and that the additional information to be derived from the surveys, must tend to confirm, in the main, that conclusion, that the writer is induced to give these pages to the press.

The project of a Railway to the Pacific is one of transcendent importance, in many points of view, and from the rapidity with which events are succeeding each other in our history as a nation, this great work, will, in all probability, soon be commenced, under efficient aid derived from the General Government.

It is very important that the best route or routes (if more than one is attempted) should be selected, any error or mistake in this respect cannot, from the magnitude of the undertaking, be easily remedied, and its mischievous consequences will extend far into the future, and affect the interests not of individuals, or of communities, or of States only, but of the whole civilized world.

Upon the choice of routes the public mind is now evidently very

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much divided, partly through the efforts which are being made to render certain places points in the proposed route, but mainly it is believed, from the want of correct information, on which to form a judgment.

If these pages shall fail to produce conviction as to the preference, which should be given in respect to the several routes noticed, their perusal will, the writer trusts, aid in removing many erroneous impressions, and prepare the mind for a better understanding and appreciation of the subject in all of its bearings whenever the reports of the surveys now in progress shall be rendered.

The authorities which have been consulted in relation to the subject are, it is believed, all named as occasion offered for a reference to them, and it has been the aim to present their testimony in their own words that the reader may judge for himself as to its tendency and force.

The labor of collecting this testimony and putting it into the shape here offered to the public, has been mostly performed amid the active duties of a profession, under circumstances which compel the writer to solicit the indulgence of the public for any defects which may be found in the work.

EDWIN F. JOHNSON.

Middletown Conn. 1853.

GENERAL VIEW.

The necessity for a Railway communication between the principal Atlantic cities of the United States, and the shores of the Pacific, has now become so apparent that public attention is being particularly directed to the best method of accomplishing the object.

The points on the Pacific Coast desirable to be reached, as having suitable harbors, or conveniences for shipping, and as being favorably situated for concentrating the business of that portion of the Union, are San Diego and San Francisco, in California, the Columbia River, in Oregon, and the waters connected with the Straits of Juan De Fuca, in the new territory of Washington.

The entire Pacific coast within the limits of the United States, presents no other so eligible points as these.

Of the places named, the waters connected with the Straits of De Fuca, afford harbors and suitable sites for a maratime city, greatly superior, probably, to the others. The relative merits of these several points for a great commercial mart on the Pacific coast, will be a subject for future consideration.

The prominent points on the Atlantic seaboard, or those which are most favored in respect to climate, and which command most of the capital of the country, and within which is concentrated the greatest amount of commercial and manufacturing interest, are Boston, New York, Philadelphia and Baltimore.

Of these, New York is decidedly the first, and Philadelphia, only eighty miles distant from it in a direct line, the second. Of the others, one is situated at the north, and the other at the south of the two just named.

The city of New York, from its commanding position in respect to the navigation of the Atlantic and of the great Lakes, and the commercial preeminence it has already attained, is clearly the most desirable single point on the Atlantic to be connected with the Road in question.

In determining the most eligible route, from New York city westward, for the proposed Road, it is necessary to consider the character of the country through which it is to pass, its topographical features, soil, climate and mineral resources, and any other objects of importance in a military or commercial view.

A Railroad to the Pacific is not only essential as a means of a direct communication with our own possessions, now rising rapidly into importance on that portion of the Continent, but if rightly located, will constitute the channel through which must pass much of the trade and nearly all the travel between the countries and cities situated on both shores of the northern Atlantic, and the eastern coast of Asia, and which must afford an amount of business and revenne to the Road, exceeding probably at first what may be furnished to it from the other sources within our own borders.

The eastern portions of Asia, including China and Japan, and countries adjacent, which are known to contain a population of many millions, in an advanced stage of civilization, in a condition to furnish a very profitable commerce; a commerce which has greatly enriched all that have hitherto participated in it, are situated from three thousand to seven thousand miles only from our Pacific coast.

The place in Eastern Asia which is the most central to this large population, and to the great cities of Canton, Nankin, and Pekin, in China, and Jeddo, in Japan, containing each from one to two millions of inhabitants; and which, under the present government, as a free port is accessible, and can be occupied by our vessels, without interfering with European powers, is the city of Shanghai, in China, situated on the Tung Hai or Eastern Sea, near to the mouth of the Yang Tse Kiang, the great river of China.

From New York city to this point, the shortest and most direct line (which is indicated by the arc of a great circle of the earth connecting the two) passes considerably to the north of the forty-ninth degree of north latitude, where the latter meets the Pacific, and hence the Straits of Juan de Fuca, the most northern of the places named on our Pacific coast, are situated nearest to the direct line to China, within the limits of the United States, and are in this particular, the most suitable for the Western terminus of the proposed Railroad.

In proceeding from New York City to the Straits of De Fuca, the position of the great Lakes and of the international boundary make it necessary to deflect the line so far to the south as to pass the southern extremity of Lake Michigan.

The City of Chicago, which is the nearest port of any magnitude to that portion of the lake, becomes, therefore, a point in the proposed route. This city is also indicated as a suitable point on the line of the proposed Road, from its probable future relation to the internal commerce of the United States. Its position at the south-western limit of the unrivalled navigation of the great lakes, and the outlets therefrom to the Atlantic, and the vast and very fertile region commercially dependent upon it at the west, a region which is rapidly filling up with a population unsurpassed for intelligence and enterprise, give assurance of its becoming ultimately the greatest of the very large and flourishing inland cities of our Union, and as such, would justify a departure, to a certain extent, from the direct course of the proposed Road, even if there were no other reasons such as have already been stated for such a deviation.

From the city of Chicago lines of Railroad, by very direct routes, are either already built or in a course of construction, leading to all the prominent cities named, and others on the Atlantic seaboard, and hence there is no occasion for any further notice of this portion of the route.

The city of Chicago is distant from the Straits of De Fuca, in a direct line, 1,752 miles, as computed from the latitudes and longitudes of the two places. This line is represented upon the accompanying map, and appears as a curved line crossing the Missouri River in lat. 46° N. nearly, and passing to the north of the Great Falls on that river.

In examining the position of this line, it will be seen that a principal obstacle to the attainment of a direct route for a Railroad between the points named, is the prolongation, to the north and east, of the chain of mountains, known as the Wind River or Black Mountains, which extend from near the South Pass of the Rocky Mountains north-easterly between the Yellow Stone and Missouri Rivers, to near the latitude of 48° N., and thus cause the great bend in the direction of the latter river in its course to the ocean in the latitude named.

There are other obstacles which are also of a serious character on the direct course. These are the crossings of the Mississippi, Missouri, and Yellow Stone rivers, where they are navigated by large boats; the range of mountains between the Yellow Stone and upper Missouri, and the more broken and unfavorable character of the surface generally from the Mississippi River to the Rocky Mountains. These latter, which lie at the sources of the Missouri, present, as will be seen hereafter, under a slight deviation from a direct course, no very serious obstacle to the passage of a Railroad.

The chain of Wind River and Yellow Stone Mountains, and the other principal obstacles named, are all entirely avoided by carrying the line direct from Chicago to the Great Bend of the Missouri, above mentioned; a departure from the direct course which will not very much increase the distance, and which is fully compensated for, irrespective of its superiority from the circumstances named, by the greater facilities which the country affords for the construction of a Railroad in the supply of timber and other materials, and in the opportunity afforded for a connection by a branch Railroad with the west end of Lake Superior, and through that with the chain of inland waters of which that lake forms a part.

From the Great Bend of the Missouri the route proposed is along the northern side of that river to one of several Passes which are known to exist between its sources and those of the Flathead or Clark's branch of the Columbia river; and thence along the valley of Clark's river, and of the Columbia, to some point in the vicinity of Fort Okanagan. Here the proposed route leaves the Columbia, and after surmounting the elevated ground which forms the northern extremity of the Cascade or President's range of mountains, terminates at the desired point on the Pacific.

To return to the Rocky Mountains. These mountains, which separate the waters of the Atlantic from the Pacific, do not, at the place proposed for crossing them, possess the formidable character as mountain barriers which pertain to them in other places. They are here very much reduced in height, and are penetrated by Passes or defiles which are evidently very feasible for a Railroad.

The Rocky Mountains, instead of being a lofty chain of uniform or nearly uniform elevation, extending from the Mexican Andes northward to the Arctic Seas, appear, upon examination, to be arranged in a series of groups, similar, although on a very much larger scale, to the White Mountains of New Hampshire, or the Adirondacks of New York. In elevation their highest peaks within the limits of the United States, are equalled, if not surpassed, by those of another and parallel range lying nearer to the Pacific, and known as the Sierra Nevada and Cascade or President's range of mountains.

Within the limits of the United States are two very marked depressions in the range of the Rocky Mountains. One where the sources of the river Gila approach the waters of the Rio Grande Del Norte, near the Mexican boundary, the other at the place already named between the sources of the Missouri and the Columbia.

Between these is an extended group or series of mountains, varying in height at different points, and divided by passes into lesser groups, from whose slopes flow the waters of the Columbia, the Colorado, the Rio Grande Del Norte, and the Missouri and Mississippi. The mountains which compose this immense group are situated upon a plain elevated on their southern and eastern side 4,000 to 5,000 feet above the level of the sea; and on their northern and western side from 3,000 to 4,000 feet above the same level.

The Mount Washington of the northern section of this group is Freemont's Peak, near the South Pass, so called, rising to the height, according to the measurement of the Explorer, from whom it takes its name, of 13,570 feet above the Ocean level. This and the three Tetons and the three Buttes are the most noted points in this portion of the series. All of them being visible to travellers by the South Pass for some distance along their route.

From these elevated points proceed ranges in various directions. The Bear Mountains to the south. The Green River Mountains forming the main range or Rocky Mountains proper, to the south-east. The Wind River and Black Mountain chain to the north-east; the Salmon River Mountains to the west; the Kooskootskie Mountains to the north-west, and the continuation northerly of the main range to the place of general depression, which is in a line nearly with the valleys of the Upper Missouri and Clark's branch of the Columbia—a depression which may be considered as extending through three or four degrees of latitude, since within these limits no less than five Passes are known to exist, from such partial explorations as have thus far been made.

In proceeding north beyond the latitude of forty-nine or fifty degrees, the mountain chain again rises, attaining its highest elevation in the Caledonia group, in British North America, in latitude fifty-two or fifty-four degrees north, near which are found the lofty peaks of Mt. Hooker and Mt. Brown, the former 15,700 feet, and the latter 16,000 feet above the level of the sea. Gathered about these, or issuing from them are other peaks and ranges forming the series or group from whence flow the waters of the north branch of the Columbia and Fraser's River on the west, McKenzie's River on the north, and Peace River and the Saskatshawan on the east.

The length of the route as above described, from the city of Chicago to the Pacific, is estimated as follows, viz:—

In Illinois,	70	miles.
Wisconsin,	290	"
Minnesota,	620	"
Missouri (N. W.) Territory,	420	"
Washington "	560	"
Total,	1,960	"

Of this distance nine hundred and ninety miles, or about one half of the whole, are embraced under existing acts of incorporation, granted by the several States and Territories for the construction of a Railroad on the proposed route, as follows:

The portion in Illinois is included in the charter of the "*Illinois and Wisconsin Railroad Company.*" That in Wisconsin in the charter of the "*Rock River Valley Union Railroad Company;*" and that through Minnesota in the charter of the "*Minnesota Western Railroad Company.*"

The portion of the line in Illinois is located and under contract. Forty miles of it are graded, and twenty-five miles of track have been laid from Chicago west, and a considerable expenditure has been made for equipments. The Company will soon commence the business of transportation, and the Road will be completed to the Wisconsin line by the first day of July next.

Of the portion in Wisconsin, fifty-five miles are located and under contract, and the grading is in progress at various points. This portion passes through Janesville in the Rock River Valley, the principal town in the interior of the State, and extends to Madison the capital of the State. This portion will also be completed by the first day of July next.

It may not be improper to state here that the same company are authorized to construct a branch from Janesville northerly along the Rock River Valley to Lake Superior. This branch is now under contract and building to Fond du Lac, on the Winnebago Lake, eighty-six miles from Janesville. Forty miles of it are graded and the track laid for half that distance, and transportation has already been commenced upon it.

This branch, when completed, will extend to the copper region of Lake Superior, and connect with the navigation of that Lake, and as it passes through a rich and productive portion of the State, will eventually do a large business.

From Madison, on the main line northwesterly, surveys have only been carried a short distance beyond the Wisconsin River. For the remaining distance, to the Minnesota line, the ground has not yet been instrumentally examined, with a view to the location of a Railroad. Measurements for other purposes have, however, been made, sufficient to show its general character, and that two routes, at least, exist, either of which are very favorable for the purpose.

In Minnesota a survey or reconnoisance has been instituted under the late Act of Congress, making an appropriation for the exploration of several routes for the Pacific Road. These surveys for the line in question, are under the direction of Gov. Stevens of the new territory of Washington, who will continue his reconnoisance to the Pacific, upon the route of the proposed Road.

The charter in Minnesota is a very liberal one. It secures to the Company all lands which may be granted by Congress in aid of the road within the limits of the territory, without further action on the part of the government of the territory, and is held by the same parties who are engaged in constructing the lines in Illinois and Wisconsin.

The Companies in the two latter States, have entered into an agreement authorized by their respective Charters, to consolidate and bring them under one common management, and a similar arrangement is to be entered into with the Company in Minnesota, as soon as an organization is effected in that territory.

The Road in Illinois and Wisconsin is being built with the wide gauge of six feet, a very proper gauge for a Road of the character of the one in question. Arrangements for harbor accommodations and necessary depot grounds, in the city of Chicago, and at the west end of Lake Superior and elsewhere, have been made, and are on a scale commensurate with the importance and magnitude of the work.

The population along and near to the located portion, is already large, and is very rapidly increasing. Irrespective of the continuation to the Pacific, the importance of the several lines named in Illinois, Wisconsin and Minnesota, to accommodate the region of country lying west of the great Lakes, is such as to place them in the very first class of main trunk Roads.

DESCRIPTION OF THE PROPOSED ROUTE.

CHARACTER OF THE SURFACE, AND ESTIMATE OF COST.

The general topographical view, which has been presented of the country for the entire distance from Chicago to the Pacific, although sufficient, perhaps, to show the probability of a favorable route for a Railway being obtained, is not complete enough in its details, to furnish the requisite data for arriving at a satisfactory conclusion in respect to its gradients and cost, and other circumstances important to inspire confidence in an enterprise of so great magnitude.

Fortunately the information which is wanting, is derivable from various sources, to a degree which leaves no doubt of the general character of the proposed route, both in respect to its probable cost and to its efficiency for the purposes designed, and also in reference to its superiority, when compared with other lines or routes which have been proposed for effecting the same object.

The elevation of Lake Michigan above the sea level, is placed by most writers at 578 feet, or thirteen feet only higher than Lake Erie, which is known to be 565 feet, by several lines of level carried to the tide waters of the Hudson.

The estimated difference of thirteen feet is probably somewhat less than the actual difference. The error, if any, is not important to this enquiry.

Between Lake Michigan and the Mississippi River the surface of the country, although considerably varied, has no very marked features produced by any very great difference in elevation of its several portions. Lapham, in his work on Wisconsin, states that "there are no mountains, properly speaking, in Wisconsin, the whole being one vast plain varied only by the river hills and the gentle swells or undulations usually denominated *rolling*. This plain lies at an elevation of from 600 to 1,500 feet above the level of the Ocean. The highest lands are those forming the dividing ridge between the waters of Lake Superior and the Mississippi. From this ridge there is a gradual descent to the south and southwest."

This gradual decline of the general surface of the country is continued far down into Illinois. The portion of it from the latitude of Green Bay south is much of it prairie—but there is both in northern Illinois and southern Wisconsin an ample supply of timber of the best description for Railroad purposes, consisting principally of oak, of which the white and burr oak is the most abundant. Pine, of which there is a large supply in northern Wisconsin, is not found in the southern part of the State, or in Illinois.

Messrs. Foster and Whitney in their description of the country south of Lake Superior, represent the line of summits which separate the Mississippi and St. Lawrence system of waters, in northern Wisconsin as elevated about 1,500 feet above the Sea. This higher region is primitive in its formation, a character which does not attach to any portion of the country in Illinois or Wisconsin traversed by the line of the proposed Railroad.

From Chicago *via* Janesville to Madison, the capital of Wisconsin, 125 miles, the Road as located is as near to a direct line as it is possible to place it, and differs in length only a fraction of a mile from a straight line.

The maximum gradient on this portion is 40 feet in one direction, and 30 feet in the other, the average rise and fall for the entire line being only 16 feet per mile.

From Madison to the Wisconsin, or La Belle River, the preliminary survey gives forty feet per mile as the maximum gradient.

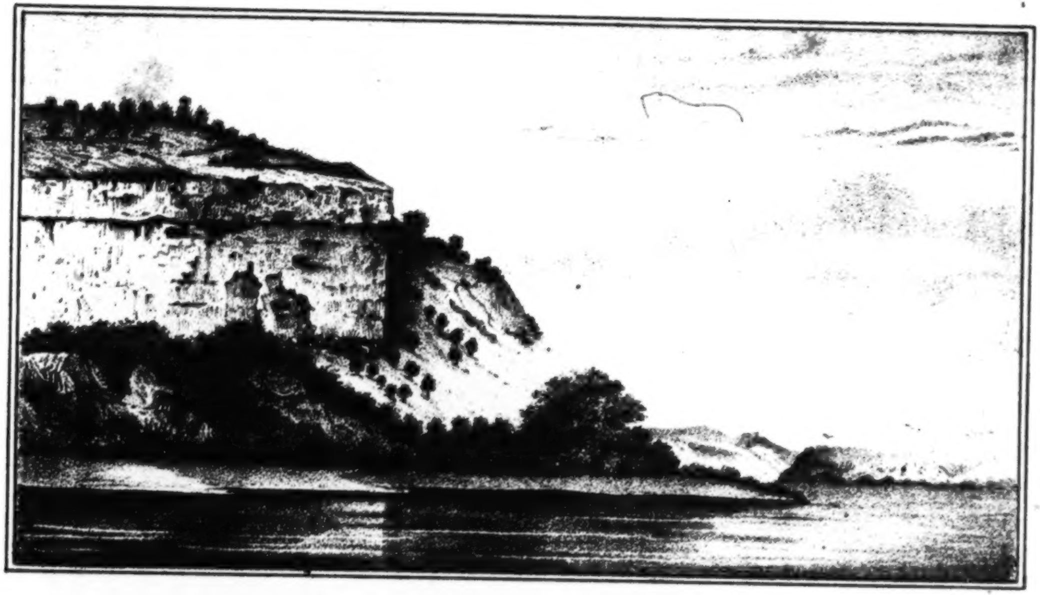
The Wisconsin River, which is navigable to the Mississippi, is near the point of crossing, 772 feet above the Ocean level. If crossed at an elevation of ninety feet above highest water, to enable the class of steamers navigating it to pass underneath, which is practicable, as the banks on both sides are in many places sufficiently elevated and bold for the purpose, the grade line will be elevated eight hundred and eighty-two feet nearly above the Sea. Distance from Madison 23 miles.

From the Wisconsin River to the Mississippi, at Prairie La Crosse, the distance is estimated at 92 miles. The ground between these points rises to an elevation of about 1,400 feet above the Sea. Recent examinations show a depression at one point, between the Lemonwier and La Crosse Rivers, 200 to 300 feet lower. A preliminary survey extending one half of the distance, gives for the maximum grade 40 feet per mile, and it is quite certain there need be no gradient exceeding that amount for the remainder of the distance to the Mississippi.

At La Crosse the elevation of the line is 700 feet nearly above the Ocean level. From thence along the eastern shore of the Mississippi to the head of the Falls of St. Anthony the rise is about 120 feet, the estimated elevation of the line at that place being 820 feet.

From the sources of the Lemonwier River, the line, instead of descending to the Mississippi at La Crosse, may be carried along the table land of the interior, where the cost of construction may be less, but the line will be more undulating, and distance about the same. This line if adopted must be placed far enough from the river to avoid the *coulées* or *bassières*, as the deep ravines are sometimes called, which characterize the valleys of the several tributaries of the Mississippi in the vicinity of the latter river throughout the entire distance in question.

Upon this route the line will necessarily approach the Mississippi at the mouth of the La Croix River, the western boundary



CAP DES SIOUX or MAIDEN'S ROCK LAKE PEPIN, Mississippi R.
From Owens Geological Survey.

of Wisconsin, and from that point to the Falls will be in the vicinity of the Mississippi River, passing, like the other line, through St. Pauls, the capital of Minnesota, a point named in the charter through that Territory.

Upon the river route from Madison to La Crosse the surface is probably more broken and difficult than for the same distance from Madison on the interior route, but on neither are there any difficulties or obstacles of a very serious nature, such as are of frequent occurrence upon Railroads in the Eastern States.

From La Crosse to the Falls of St. Anthony the line occupies a position upon the east bank of the Mississippi, a distance estimated at 145 miles. In this distance are several high bluffs of limestone and sand-rock, forming a striking feature in the scenery of that part of the river. These wall-like cliffs have in general towards their bases, a *talus* or gradual slope extending to the water formed by fragments of rock and earth, detached from the precipices above, the accumulation of ages, affording in connection with the character of the rock, and of the river, facilities for the construction of a Railway far greater than are usually met with on Roads similarly situated in other sections of the country, and much less expensive than the Roads now in operation in the valleys of the Hudson, the Delaware, or the Susquehanna. Upon this line no gradient higher than 20 or 25 feet per mile will be required along the river, a feature favorable to its adoption, provided it is equally eligible in other respects.

A better point than the Falls of St. Anthony cannot be selected for crossing the Mississippi River with the proposed Railroad. One nearly as good may, perhaps, be found at some one of the Rapids above, if it shall be deemed advisable to continue the line farther up on the east side of the river.

The Falls of St. Anthony are at the head of navigation on the Mississippi for the largest class of boats. The descent of the river at these falls is 51 feet, of which about 18 or 20 feet is perpendicular. The river at the Falls is divided into two channels, by an island which is 300 feet wide The channel on the eastern side is

651 feet in width, and on the western 930 feet, making the entire distance from shore to shore across the island 1881 feet.

From the Falls of St. Anthony, the direction of the line is such as to keep it within the immediate vicinity of the Mississippi, for a distance of 60 to 70 miles. In this distance the valley is more open, and the Road can be constructed probably at less cost than along the valley below. The River then bears to the north to where it finds its sources in the *Hauteurs des terres*, or pine covered table lands, which separate its waters from those of the Red River of the North, and which are elevated 1600 to 1700 feet above the level of the sea.

These heights are crossed by the proposed line a little to the north of where the general level of the plateau rises to meet the higher elevation of the *Coteau des Prairies*, which are situated between the waters of the river St. Peters and the river Jacques, and which are elevated in latitude 46° N., 2,000 feet nearly above the level of the sea.

The elevation of the ground therefore at the summit, over which the line passes, is probably 1700 feet or thereabouts, making from the Falls of St. Anthony an ascent of about 900 feet only, the most of which is to be overcome in a distance of one hundred miles, estimating from the place where the line leaves the vicinity of the Mississippi River, as above described.

The view from the highest part of the *Coteau des prairies* is described by Nicolet as "most beautiful, overlooking the immense green turf of the valley of the Red River of the North, and of the forest capped summits of the *Hauteurs des terres* that surround the sources of the Mississippi, and the granite valley of the Upper St. Peters."

The elevation above given of the country after leaving the Wisconsin River, are derived mainly from barometrical measurements, made by I. N. Nicolet, while exploring under the direction of the War department in the years 1836-7-8 and 9, the valleys of the Upper Mississippi and Missouri, and the country between them, and the Red River of the north; measurements which appear to have been made with much care and skill, and which have been found to be very correct, so far as they have been tested by others since made.

The descent of the Red River from Lake Traverse to Lake Winnepeg, where it is 853 feet above the sea, is estimated by Col. Long, at 200 feet, and as the distance is 600 miles, the average descent is one-third of one foot per mile, which accords nearly with estimates since made by Mr. Owen. The upper portion of the river has a descent undoubtedly greater than this. The river is navigable, and this navigation extends across to the St. Peters, according to Col. Long, so that canoes of two tons burden pass from the waters of the one to those of the other.

The line as proposed crosses the Red River about forty miles below Lake Traverse, at an elevation probably of about 1000 or 1100 feet above the sea level, making the descent from the *Hauteurs des terres* to the place of crossing about 700 feet.

From the Mississippi to the Red River the country is rolling, the surface not being sufficiently varied to have any very strongly marked features, and like the valley of the Mississippi below, is well supplied with timber.

From the Red River to the last crossing of the Shayen-oju, its main west branch, a distance of about 50 miles, the line continues on ground, which if not entirely level has a remarkably even surface, being described by Mr. Owen, as a "great Savanna," "a dead level plain," "the channels of the streams being formed by excavation in the alluvial deposite, rather than by any depression in the surface of the country," a formation which "extends all the way down the valley."

Col. Long describes it as a "broad expanse of verdant prairie, spreading beyond the utmost extent of vision, and, excepting the margins of the river and those of its tributary streams, which are fringed with trees and shrubbery, there is very little to interrupt the simplicity and uniformity of the scenery. Scarcely is there an undulation to variegate the prospect." The trees which fringe the water courses consist of "several varieties of oak, white and red elm, linden, grey ash, red maple, cotton wood, aspen, hackberry, iron wood, hornbeam, and white and red pine." Col. Long saw no rock in place in the whole extent of the Red River valley from its source to Pembina at the national boundary.

M. Nicolet speaks of the "vast and magnificent valley of the Red River, spreading itself in an almost insensible slope, to the east, to the north and to the south, and bounded only by the horizon." He describes the Shayen branch as navigable for canoes to near Devil's Lake, "its banks well wooded," and as being "conspicuous by the dense green foliage of its shores." Its valley and that of the main river "possesses a fertile soil, offering many inducements to its settlement."

From the Shayen branch, the ground rises very gradually to the plateau of the *Coteau du Missouri*, the highest part of which it attains in a distance of about eighty miles. Its elevation at this point above the ocean, is assumed at 2300 feet.

Farther south, in lat. 45° N. nearly, the elevation of this plateau was ascertained by Nicolet to be 2100 feet. Its appearance at that point is described as that of a "green plain bounded only by the horizon, and presenting a smooth surface." Farther north, in the direction of the proposed line for the Road, it is described as a "high, dry rolling prairie" presenting but few "inequalities of surface" throughout its entire extent, and having an elevation but little different from the *Coteau des Prairies*, both presenting the highest ground to be found between the Gulf of Mexico and Hudson's Bay west of the Great Lakes.

From the valley of the Shayen River to the Missouri, a distance of one hundred miles, the country is destitute of timber, being, it would seem, the only portion of any very great extent on the entire line to the Pacific not supplied with that article. Over this vast prairie plain the bison and the elk still roam in immense numbers.

The highest point on the Missouri River where barometrical measurements were made by Nicolet, was at Fort Pierre in lat. 44⅓° N. nearly. This point he found to be 1456 feet above the sea. It is situated, by his estimate, which differs but little from that of Lewis and Clark, 1256 miles by the river from the mouth of the Missouri.

The mouth of the Missouri as derived from the known elevation of Lake Erie, via the Wabash Canal, and the surveys on the Ohio and Mississippi Railroad, is 380 feet nearly, above the Hudson River at Albany, N. Y.

The Mouth of the Kansas River, 382 miles above the mouth of the Missouri, is 303 feet higher, or 683 feet above the sea, giving for this portion of the Missouri a descent of $\frac{793}{1000}$ feet per mile. From the Kanzas River to Fort Pierre, the ascent is 773 feet, and distance by the river 887 miles, making the descent of this portion $\frac{871}{1000}$ feet per mile. The portion of this below Council Bluff's has an inclination of one and one-sixth feet per mile, and that above, for 583 miles, only three-fourths of one foot per mile.

Although M. Nicolet finds the elevation of the Missouri at Fort Pierre to be 1456 feet, yet in order to cover any error likely to occur from measurements made with the barometer, this amount will be increased to 1500 feet. This is believed to be an ample allowance in view of the fact that the more recent measurements of Mr. Owen on the Mississippi, give results upwards of 100 feet lower than those obtained by M. Nicolet, owing, possibly, in part, to too low an estimate of the level of Lake Superior.

Between Fort Pierre and the mouth of the Yellow Stone, the channel of the river appears to have a less inclination on the average than it has below the former point. This is inferred from the time made by boats ascending and descending. The force of the current offering less resistance to the ascent of boats, on the portion, from Fort Pierre north to the Yellow Stone, than upon the portion below. The journals of Lewis and Clark and of Culbertson, are evidence on this head. As this difference may be due in part to other causes than that of a diminished inclination of the channel, the descent for this portion will be estimated at nine-tenths of a foot per mile, which for 600 miles gives the elevation of line of the road at the mouth of the Yellow Stone 2040 feet.

This will appear to be a liberal estimate in view of the remark made by Lewis and Clark. when opposite the mouth of the Little Missouri, that "the river *continues* wide, and of about the same velocity with the ordinary current of the Ohio." The descent of the Ohio from Pittsburg to its mouth, including the falls at Louisville, averages less than *six* inches to the mile. The portion from Pittsburg to Wheeling, 88 miles, has an inclination of nine-tenths of a foot per mile; that of the portion below to Cincinnati is only six inches per mile, while that below Cincinnati is still less than this.

The proposed line approaches the Missouri River, a short distance below Fort Mandan, at a point about 300 miles below the Yellow Stone. It will have consequently by the above estimate an elevation at this point of about 1770 feet nearly, above the level of the sea.

The valley of the Missouri at this place and below, is described as a vast prairie rising very gradually on the east side, presenting in that direction no very marked elevations, the *Coteau des Missouri* being merely, in the words of Col. Long, a "grand dyke which prevents the Missouri from flowing eastward," circumstances which in connection with the fact, that the Moose River branch of the Asiniboine approaches within a mile of the Missouri River, at a point farther west, and is elevated but little above it, show very conclusively that the *Coteau du Missouri* does not increase much, if any, in altitude north of the latitude of 46°, and that it is quite safe to assume, as has been done, the elevation of the line of the Road at its highest point between the Red River and Missouri at 2,300 feet.

So low is the ground where the Moose River approaches nearest to the Missouri that it has been proposed to excavate a channel for the discharge in that direction of the surplus waters of the Missouri in times of flood, allowing them to pass off northerly into Lake Winnipeg. If this is practicable, then it would also be possible to construct a canal from this point to Bigstone Lake on the St. Peters, and by improving the navigation of this river, which it is said can be done at no very great cost, a very direct navigable route may be obtained, in connection with the improvement of the Fox and Wisconsin rivers in Wisconsin, now in progress, from the Upper Missouri to Lake Michigan, and thus avoid the tedious and difficult navigation of the lower portions of the Missouri river: or otherwise, the canal may be continued along the *Haut terres* of the Mississippi and connect at the west end of Lake Superior, by a still shorter route, with the navigation of the lakes.

Such a navigation could also readily be connected with the waters of the Red River and of James River, the former now navigable for 400 miles, and the latter susceptible of improvement at no very great cost.

From where the line of the proposed Road meets the Missouri, to the Great Falls of that river, it occupies the ground on the north side of the river, at no greater distance from it than is necessary to preserve a due degree of directness in its course. The valley of the Missouri on the north side for this distance is mostly a plain, with the surface not greatly varied, its features changing somewhat west of the Muscleshell River between that and Thompsons River, where the surface is more broken and the hills approach nearer to the river.

The character of the Missouri from the mouth of the Yellow Stone to that of the Muscleshell, a distance following its course of 390 miles, as described by Lewis and Clark, is such as to warrant the conclusion that the average inclination of its surface is very little greater than the portion immediately below.

The quantity of water flowing in this portion of the river must be considerably less than in the portion below. The Yellow Stone is the largest tributary of the Upper Missouri, draining an extent of country equal to two-thirds of that drained by the Missouri itself at the point of junction.

The dimensions of the two at this point, as given by Lewis and Clark, from actual measurement, are for the Yellow Stone 891 feet in width across the water at the surface and twelve feet deep at its deepest point, and for the Missouri 990 feet in width and the depth greater, the precise depth of the latter, and velocities of the current not being given.

From the Muscleshell River to the Falls of the Missouri, a distance of 310 miles by the river, the current is on the average more rapid than upon any equal portion below. Lewis and Clark ascended this distance with their boats at the mean rate of about thirteen miles per day, while the average below was 17 to 18 miles per day. The river is here 600 to 700 feet wide. The most rapid and difficult portion is embraced in the distance of one-third of a mile only. The water is rapid in other places, but not to the same degree as at this. From one foot to one and one-third feet per mile as the maximum, will, it is believed, be a liberal estimate, for the descent of the river from the Falls to the Yellow Stone. This gives for the elevation of the line of the proposed Road at the foot of the Falls about 2850 feet.

The character of the portion of the Missouri valley traversed by the proposed Road, from the Mandan villages west, is thus described by Lewis and Clark:

April 14—"Passed low timbered ground."
16—"The country presents the same appearance of low plains and meadows, bounded on the right a few miles back by broken hills which end in high but fertile lands, the quantity of timber increasing."
18—"Country presents usual variety of high lands (probably about 100 or 150 feet in height, see memo. May 3d,) interspersed with rich plains."
" 21—"Passed Whiteearth River." (This is the western boundary of Minnesota.)
" 26—"Arrived at Yellow Stone, wood land and limestone near by."
May 3—"The low grounds much wider, sometimes extend 5 to 9 miles to high lands which are much lower than heretofore, not being more than 50 or 60 feet above the low plain."
" 6—"Country continues rich, level, and beautiful, the low grounds wide, and comparatively with the other parts of the Missouri, well supplied with wood."
" 7-11—"Proceeded at the rate of 20 miles per day through beautiful and fertile plains, which rose gradually from the low grounds bordering its banks to 50 feet, and extended a perfect level at that elevation as far in places as the eye could reach.'

May, 8—"Passed Milk River"
" 11—"First pine seen on the Missouri, resembles the Virginia pine, leaves longer."
" 12—"Soil changes somewhat, more sand on the hills, plains the same.
" 19—"Character of country changing, cotton wood the only timber and scarce."
" 20—"Arrived at Muscleshell River." Lat. 47° 24′ N.
" 21—"Country in the south high and broken: pine and swamp cedar."
" 24—"Grounds higher on each side owing to ridge running N. W. and S. E."
" 26—"Scarcely any low grounds on river."
" 27—"River rapid and bounded by rugged bluffs."
" 28—"Passed Thompson's creek: low grounds on banks again wide, fertile and enriched with trees: those on the north particularly wide, hills low, opening into three large valleys to the north."
" 29—"Passed Judith River 300 feet wide."
" 30—"Rocky points" "On ascending heights country perfectly level on both sides of the river."
" 31—"High walls of black rock and white sandstone."
June 2—"Timber increases in quantity, low grounds more level and extensive and bluffs lower."
" 3—"Maria's River." Lat. 49° 25′ N.
" 12—"Left Maria's River"
" 13—"Beautiful plain. Arrived at Great Falls: river 900 feet wide, bluffs 150 to 200 feet high.'

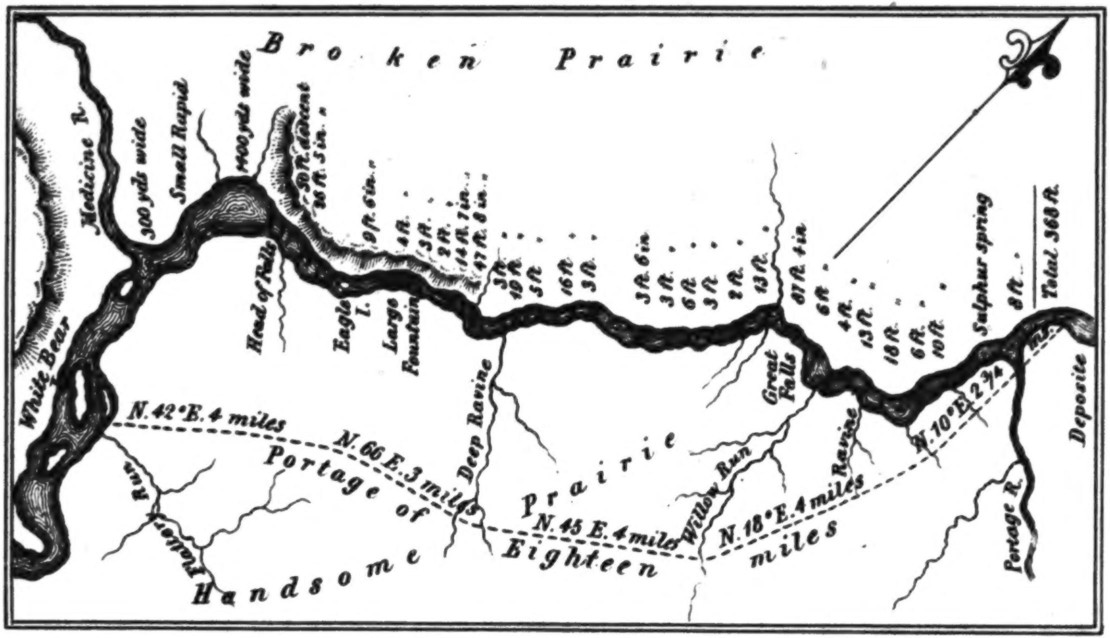
In giving a general description of the valley of the Missouri in another place, Lewis and Clark state that the hills exceed 150 feet in height for some distance below the Mandan village, but above that point "they are rather lower to the neighborhood of the Muscleshell River, where they are met by the northern hills which have advanced at a more uniform height, varying from 150 to 200 or 300 feet. From this point to the mountains, the height of both is nearly the same, from 300 to 500 feet, and the low grounds are so narrow that the traveller seems passing through a range of high country. From Maria's River to the Falls, the hills descend to the height of about 200 or 300 feet."

The above description is confirmed by Mr. Culbertson, who ascended the Missouri in 1850, (as appears by his Journal, published in the transactions of the Smithsonian Institute,) to a point above Porcupine River. From Fort Clark, near the site of the old Fort Mandan the valley is represented by him as "prairie," with "hills sixty feet in height" as far up as the Yellow Stone.

Above that point the "hills are lower," "country more level," and "banks well timbered." At a distance of about 60 miles the "hills leave the river and a broad bottom intervenes." At 80 miles "prairie to north and hilly to south;" "country more even;" "good timber." At 90 miles Martha's river, "very wide rolling prairies, on north side no hills" Below Milk river, "very extensive and level prairie to the north." Between Milk and Porcupine river, "in midst of most magnificent prairies." Above Porcupine river "continuation of prairie country, especially on the north side," "beautiful rolling prairie all along, excepting occasional timbered points."

From the preceding it is evident that the valley of the Missouri, from Fort Mandan to the Great Falls, is an immense plain, particularly on its north side, and principally prairie, interrupted only by the broken region between the Muscleshell and Thompson rivers, a character which belongs, from all accounts, to the entire space between the Missouri and Saskatshawan, and Assiniboin rivers. In all this distance of nearly 500 miles, the valley appears to rise very gradually at the average rate of about two feet per mile. This, in connection with the very favorable character of the surface, as described, between the Missouri and Mississippi rivers, leads to the conclusion, that in the entire distance, from the latter to the Great Falls of the former, embracing nearly one thousand miles, no gradient will be required exceeding 25 to 30 feet per mile. The road can be located on long, straight lines, with but comparatively few changes in direction, and the grading will, in general, be light.

The line of the road for more than half of the distance will not be very far from the navigable waters of the Mississippi and Missouri. With respect to timber for construction, it is apparent that the borders of the Missouri and its branches, from Fort Mandan to the Falls are in general fringed with it, and when not found on the river banks, can de procured without difficulty from the branche or from parts of the river which are better supplied with it.


Broken Prairie
White Bear
Medicine R.
300 yds wide
Small Rapid
1400 yds wide
Head of Falls
30 ft. descent
26 ft. 5 in. „
9 ft. 6 in. „
Eagle I.
Large Fountain
4 ft. .
3 ft. .
2 ft. .
14 ft. 7 in. „
47 ft. 8 in. „
3 ft. .
19 ft. .
5 ft. .
16 ft. .
3 ft. .
3 ft. 6 in
3 ft. .
6 ft. .
3 ft. .
2 ft. .
13 ft. .
Great Falls
87 ft. 4 in
6 ft. .
4 ft. .
13 ft. „
18 ft. „
6 ft. .
10 ft. .
Sulphur spring
8 ft. ..
Total 368 ft.
Deposite
N. 42° E. 4 miles
N. 66 E. 3 miles
N. 45 E. 4 miles
N. 18° E. 4 miles
N. 10° E. 2 ¾
m.
Portage of Eighteen miles
Handsome Prairie
Flattery Run
Deep Ravine
Willow Run
Ravine
Portage R.

FALLS AND PORTAGE OF THE MISSOURI RIVER.

From Lewis and Clark.

Near to the Great Falls of the Missouri which are 87 feet perpendicular, are rapids and smaller falls extending through a distance of about twenty miles. These falls and rapids were examined carefully by Lewis and Clark and the descent at each noted. From their estimate it appears that the entire descent is 368 feet, which gives for the elevation of the line, upon the plain above the Falls, 3,250 feet, nearly, above the level of the sea.

The length of the portage passing these obstructions to the navigation is 18 miles.

The Missouri River above the Falls is about 500 feet wide, and maintains this width nearly to where it loses its name at the junction of its three large tributaries, the Gallatin, Madison, and Jefferson rivers, a distance of 230 miles from the Falls, following the course of the river. The last named branch is the most westerly of the three. It is also the largest and least rapid, and from it at a point in lat. 44½° N. 500 miles nearly from the Falls (through all of which distance it is navigable with canoes,) there is a portage of only 38 miles in length, and over ground comparatively level for most of the distance, and no portion of it difficult, to the waters of the Salmon river branch of Lewis' fork of the Columbia. This was the route pursued by Lewis and Clark on their way to the Pacific.

After reaching the Salmon river and continuing some distance along it in a north-westerly direction, they passed over nearly due north to Clark's branch of the Columbia, and along that stream as far as Travellers Rest creek, a tributary to it from the west. This latter stream they ascended to near its source, westerly in the mountains, and thence into the valley of the Kooskootakie, a branch of Lewis' river, which they descended, and continued on to the mouth of the Columbia, where they remained during the winter.

The next Spring they returned by the same route as far as Clark's river, at the mouth of Travellers Rest Creek. Here one division of the party, under Capt. Clark, took the route up Clark's river, and thence across by the sources of Wisdom river, to Jefferson river, and down the latter to the head of the Missouri, at the

Grand Forks; thence up Gallatin river, which is navigable, to a point only 18 miles from the Yellow Stone, where there is a portage to the latter river over very feasible ground. Across this they passed, and proceeded thence down to the mouth of the Yellow Stone, a short distance below which they were joined by the party under Capt Lewis.

The latter party after separating from their companions at Travellers Rest Creek, passed down Clark's river a few miles to a large branch coming in from the East. This branch they followed to one of its sources, from whence they crossed to the valley of Medicine river, and thence along that river to the Missouri, passing, before reaching the Medicine river, Dearborn river, which is also a branch of the Missouri.

The several routes traversed between the sources of the Missouri and Columbia, by these intelligent and indefatigable explorers, are represented on a sketch annexed, marked (No. 2,) to which the reader is referred.

The route proposed for the line of the Railroad from the Missouri to the Columbia, leaves the Missouri at the head of the Falls and thence across by the path last described as followed by Capt. Lewis on his return. This will be termed the "LEWIS PASS" and as its character is of great importance in this inquiry no apology will be needed for giving here an extract from the journal itself, premising that the latitude of the camp near the mouth of Travellers Rest Creek, as ascertained by Capt. Lewis, is 46° 48′ 28″ N.

July 3, (1805)—"The nine men and five Indians who accompanied Captain Lewis, proceeded in a direction due north down the west side of Clark's River. Half a mile from the camp we forded Traveller's Rest creek, and two and a half miles farther passed a western branch of the river, one mile beyond this was a small creek on the eastern side, and a mile lower down the entrance of the Eastern branch of the river. This stream is from 90 to 120 yards (270 to 360 feet) wide, and its waters, which are discharged through two channels were more turbid than that of the main river. The latter is 150 yards (450 feet) in width, and waters an extensive level plain and prairie, the lower parts of which are ornamented with the long leafed pine and cottonwood, while the tops of the hills are covered with pine, birch, and fir. We proceeded two miles further to a place where the Indians advised us to cross." * * * *

"The Indians now pointed out to us a road at no great distance which they said would lead up the eastern branch of Clark's River to another river called *Cokal-*

shishkit, or the *river of the road to the buffaloes*, and thence to Medicine River and the Falls of the Missouri.

They added that not far from the dividing ridge of the waters of Clark's River and the Missouri the roads forked, and though both led to the Falls, the left hand road was the best, the road was so well beaten, they thought, that we could no longer mistake it, and having now shown us the way they were anxious to go in quest of their friends the Shalees. * * *

July 4.—Having taken leave of the Indians we mounted our horses and proceeded up the east branch of Clark's River through the level plain in which we were encamped. At the distance of five miles we had crossed a small creek fifteen yards wide and now entered the mountains. The river is here closely confined within the hills for two miles, when the bottom widens into an extensive prairie and the river is 110 yards wide. We went ten miles further over a high plain, succeeded by a low and level prairie to the entrance of Cokalahishkit. This river empties itself from the northeast, is deep, rapid, and about sixty yards wide, with banks which, though not high, are sufficiently bold to prevent the water from overflowing. The east branch of Clark's River is ninety yards wide above the junction, but below it spreads to one hundred. The waters of both are turbid. The Cokalahishkit is clearer of the two. The beds of both are composed of sand and gravel, but neither is navigable on account of the rapids and shoals which obstruct their currents.

Before the junction of these streams the country had been bare of trees, but as we turned up the west branch of the Cokalahishkit we found a woody country though the hills were high, and low grounds narrow and poor. At the distance of eight miles in a due east course we encamped in a bottom where there was abundance of excellent grass. * * * Near the place where we crossed Clark's River we saw at a distance some wild horses, which are said, indeed, to be very numerous on this river.

July 5.—Early in the morning we proceeded on 3½ miles in a direction N. 75° E., then inclining to the south crossed an extensive, beautiful and well watered valley, nearly twelve miles in length, at the extremity of which we halted for dinner. Here we obtained a great quantity of quamash, and shot an antelope from a gang of females, who at this season herd together apart from the bucks. After dinner we followed the course of the river easterly for six miles to the mouth of a creek thirty-five yards wide, which we called Werner's Creek. It comes in from the north and waters a high extensive prairie, the hills near which are low and supplied with the long leafed pine, larch, and some fir. The road then led N. 22° W., four miles, soon after which it again turned N. 73° E., for two and a half miles, over a handsome plain watered by Werner's creek to the river, which we followed on in an eastern direction through a high prairie rendered very unequal by a vast number of little hillocks and sinkholes, and at three miles distance encamped near the entrance of a large creek twenty yards wide, to which we gave the name of Seaman's creek. (31 miles in all this day.)

July 6.—At sunrise we continued our course eastward along the river.

At seven miles distance we passed the north fork of the Cokalahishkit, a deep and rapid stream forty-five yards wide, and like the main branch itself somewhat turbid, though the other streams of this country are clear. Seven miles further the river enters the mountains, and here end the extensive prairies on this side, though they widen in their course towards the southeast and form an

Indian route to Dearborn's river, and thence to the Missouri. From the multitude of knobs irregularly scattered through the country, Capt. Lewis called it the *Prairie of Knobs.* It abounds in game, as we saw goats, deer, great numbers of burrowing squirrels, some curlews, bee-martins, woodpeckers, plovers, robins, doves, ravens, hawks, ducks, a variety of sparrows, and yesterday observed swans on Werner's creek.

Among the plants we observed the southern wood and two other species of shrubs of which we preserved specimens. On entering the high grounds we followed the course of the river through the narrow bottoms, thickly timbered with pine and cotton wood intermixed and variegated with the bois rouge, now in bloom, the common small blue flag and pepper grass, and at the distance of three and a half miles reached the two forks of the river mentioned by the Indians. They are nearly equal in width, and the road itself here forks and follows each of them. We followed that which led us in a direction N. 75° E. over a steep high hill, thence along a wide bottom to a thickly wooded side of a hill, where the low grounds are narrow, till we reached a large creek, eight miles from the forks and twenty five from our last encampment.

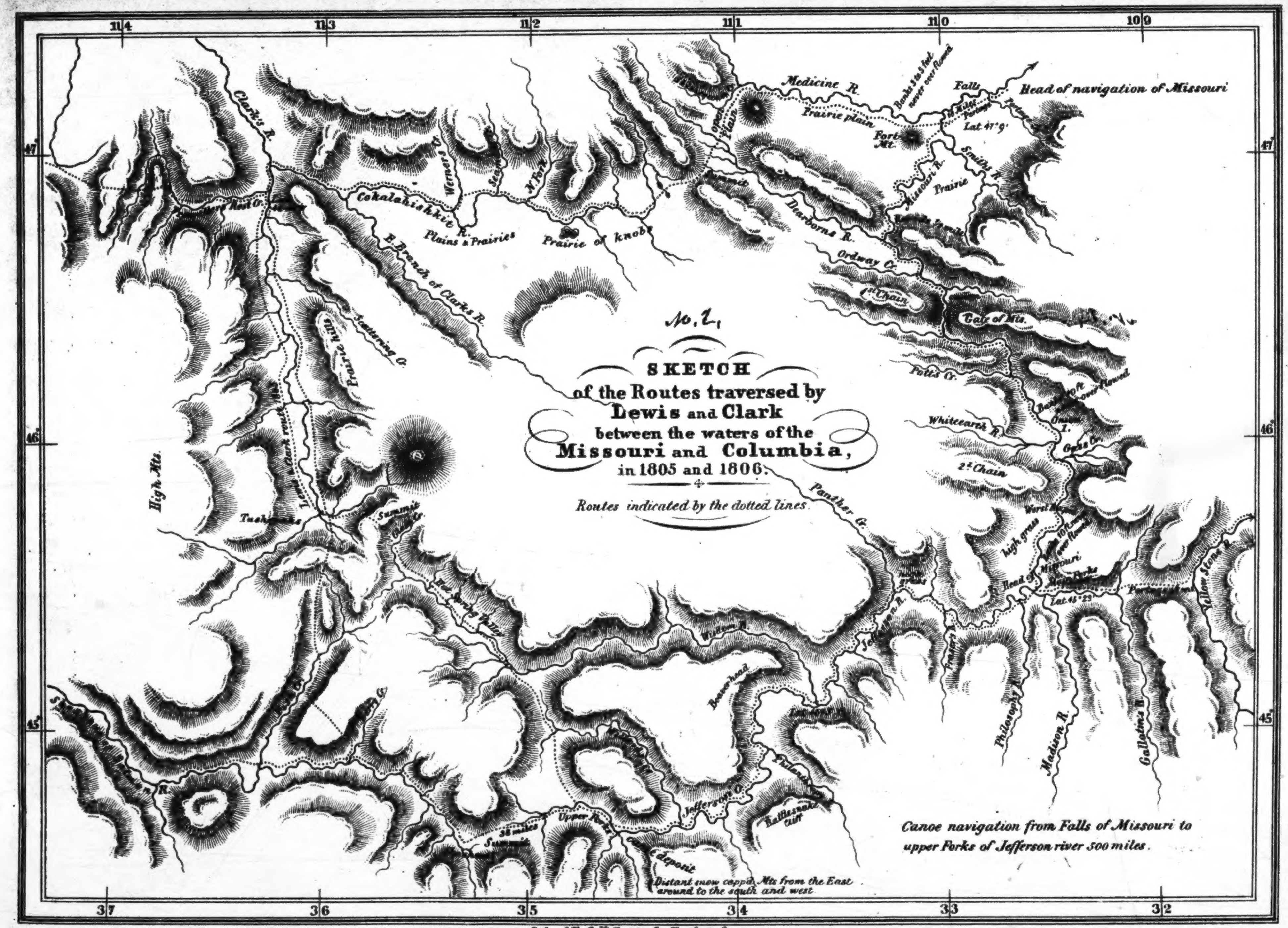
July 7.—We proceeded through a beautiful plain on the north side of the river, which seemed here to abound in beaver. On the low grounds there was much timber, and the hills were covered chiefly with pitch pine, that of the long leafed kind having disappeared since we left the Prairie of the Knobs. At the distance of twelve miles we left the river, or rather the creek, and having for four miles crossed two ridges in a direction N. 15° E., again struck to the right, proceeding through a narrow bottom covered with low willows and grass, and abundantly supplied with both deer and beaver.

After travelling 7 miles we reached the foot of a ridge which we ascended in a direction N. 45° E. *through a low gap of easy ascent from the westward*, and on descending it were delighted at discovering that this was the dividing ridge between the waters of the Columbia and those of the Missouri. From this gap Fort Mountain is about twenty miles in a north-east direction. * * * "We now wound through the hills and hollows of the mountains, passing several rivulets which ran to the right, and at the distance of nine miles from the gap encamped, having made thirty-two miles. We procured some beaver and this morning saw tracks of buffalo." * * *

July 8.—"At three miles from our camp we reached a stream issuing from the mountains to the south-west (east)." * * * * * * "We called it Dearborn river. Half a mile further we observed from a height the Shishequaw Mountain, a high insulated eminence of a conical form standing several miles in advance of the eastern range of the Rocky Mountains and then about eight miles from us, and immediately on our road which was in a north-east direction; but as our object was to strike Medicine River and hunt down to its mouth, * * * we determined to leave the road and therefore proceeded due north (10 miles) through an open plain till we reached Shishequaw creek, a stream about twenty yards (60 feet) wide with a considerable quantity of timber on its low grounds.

Here we halted and dined, and now felt by the luxury of our food, that we were approaching once more the plains of the Missouri so rich in game.

We saw a great number of deer, goats, and wolves, and some barking squirrels and for the first time caught a distant prospect of two buffalo. After din-



No. 2,

SKETCH
of the Routes traversed by
Lewis and Clark
between the waters of the
Missouri and Columbia,
in 1805 and 1806.

Routes indicated by the dotted lines.

Canoe navigation from Falls of Missouri to upper Forks of Jefferson river 500 miles.

Distant snow capp'd Mts from the East around to the south and west

114
113
112
111
110
109
47°
46°
45°
37
36
35
34
33
32
Clark's R.
Cokalahishkit R.
Werner's Cr.
N. Fork
Plains & Prairies
Prairie of knobs
E. Branch of Clarks R.
Scattering Cr.
Prairie hills
Lewis & Clark route
High Mts.
Tushepaws
Summit
Hot Spring Valley
Medicine R.
open Plain
Prairie plain
Banks 3 to 5 feet never over flowed
Falls
Head of navigation of Missouri
10 Miles Portage
Portage
Lat. 47° 9'
Fort Mt.
Smith's R.
Missouri R.
Prairie
Dearborns R.
Ordway Cr.
1st Chain
Gate of Mts.
Pott's Cr.
Whiteearth R.
Onion I.
Gass Cr.
2d Chain
Panther Cr.
high grass
Head of Missouri
Main Forks
Lat. 45° 23'
Yellow Stone R.
Jefferson R.
Frazier's R.
Philosophy R.
Madison R.
Gallatin's R.
Wisdom R.
Beaverhead
Jefferson Cr.
Rattlesnake cliff
Upper Forks
38 miles
Summit
deposit
R.

Lith. of E. C. Kellogg & Co., Hartford, Conn.

ner we followed the Shishequaw creek for six and a half miles to its entrance into Medicine River, and along the banks of this river for eight miles, when we encamped on a large Island. The bottoms continued low, level, and extensive; the plains too were level, but the soil of neither was fertile, as it consisted of a light colored earth intermixed with a proportion of gravel; the grass on both was generally about nine inches high. Capt. Lewis here shot a large and remarkably white wolf. We had made twenty-eight miles. * * *

It rained the whole of the next day and they advanced but eight miles over extensive bottom lands tolerably well supplied with narrow leafed cotton wood. "The river is about 80 rods wide, with banks, which though low, are seldom overflowed; the bed is composed of loose gravel and pebbles, the water clear and rapid, but not so much as to impede navigation. The bottoms are handsome, wide and level and supplied with a considerable quantity of narrow leafed cotton wood. During our short ride we killed two deer and two buffaloes and saw a number of wolves and antelopes.

July 10.—We set out early, and proceeded through a country similar to that of yesterday with wide leafed cotton wood, occasionally along the borders of the bottoms, though for the most part the low grounds were without timber. In the plains were great quantities of two species of prickly pear, then in bloom. Gooseberries of the common red kind were in abundance, and just beginning to ripen. The river had now widened to 100 yards (300 feet) was deep, crowded with islands, and in many parts rapid. At the distance of seventeen miles the timber disappeared totally from the bottoms. About this time the wind, which had before blown on our backs and put the elk on their guard, shifted round, and we shot three of them and a brown bear. * * * We saw vast numbers of buffalo, below us, which kept up a dreadful bellowing through the night. With all our exertions we were unable to advance more than twenty-four miles owing to the miry state of the ground, occasioned by the rain.

The next morning, however, *July* 11, was fair and enlivened by multitudes of birds, which sung delightfully in the clusters of cotton wood. The hunters were sent down Medicine River in pursuit of elk, while Capt. Lewis crossed the high plain in a direction N. 75° E. to White Bear Island (near the head of the Falls of the Missouri River in lat. 47° 9′ N.) a distance of eight miles, and here they joined him.

They had seen some elk, but in this neighborhood the buffalo were in such numbers that on a moderate computation there could not have been less than 10,000 within a circuit of two miles. * * * Among the smaller game were the brown thrush, pigeons, doves, and a beautiful bird called the buffalo pecker."

From the main summit to the Missouri river, at White Bear island the distance by the computation of Capt. Lewis, on the route travelled by him, is eighty miles. It is assumed to be 70 miles, as he informs us that he did not pursue the direct route easterly, but maintained a northerly direction to Medicine river. The direct distance from the main summit to White Bear island is given at 28 miles, for Capt. Lewis states that from the summit or Gap, "Fort Mountain is about 20 miles in a N. E. direction," and when passing up the Missouri Fort Mountain is represented as being 8 miles from White Bear island. It is possible the distance from the Gap to Fort Mountain may have been underrated, but it must be very wide indeed of the truth to make the summit more than 40 miles in a direct line from White Bear island. In calling it 70 miles, a sufficiently liberal allowance is supposed to be made for any increase of distance necessary, to bring the gradients and expense within a reasonable limit.

From the description of the ground the descent in the 45 miles nearest to the Missouri river cannot be great. Ten feet per mile is believed to be a liberal estimate, making the height of the line at the "Open plains" about 3,700 feet. That this is sufficiently high is apparent from the fact, that the valley of Dearborn river at the place of crossing, is not, from the description, much below the level of the plains, and the valley itself cannot have a very great inclination, as we are told by Lewis and Clark when ascending the Missouri, that Dearborn river had "every appearance of being navigable."

From the "open plain" to the main summit or *Divortia aquarum* the distance is about twenty miles. The line in this distance crosses Dearborn river and several of its smaller tributaries and "winds through the hills and mountains." The ascent from the open plain is evidently mostly within the last ten miles, and there is nothing in the description to authorize a greater estimate to be put upon the main summit than about 1,300 feet above the plain, *making it in round numbers 5,000 feet only above the sea.*

This estimate gives for the elevation of the main summit above the Missouri at the mouth of Dearborn river about 1,700 feet. Serjeant Gass in his narrative, in describing the heights on the east side of Dearborn river says, that "some of the knobs or peaks of these mountains are 700 (perhaps some nearly 1200) feet high." The next range in which is the *Dalle* or *Canõn* (*kenyon*) called the *Gate of the mountains*, is still higher. Lewis and Clark remark in regard to it, that "the mountains are higher to-day than they were yesterday." The walls of this *Canõn* they describe as nearly 1,200 feet high, evidently formed by a transverse break in the ridge or mountain by some great convulsion of nature, affording a narrow passage for the river; the water being deep throughout, and the length nearly six miles, which indicates the width of the mountain at the base.

While the party were ascending the river, Capt. Clark traversed this portion of the valley on foot, and to save "many miles" of distance crossed this mountain by a "wide Indian road, which in many places seemed to have been cut or dug down in the earth." It was near the close of the day when he arrived at the base of the mountain and the *same evening* he crossed over and encamped on its western side. This mountain, like the others in this region, has a direction N. W. and S. E., and being the first encountered west of Dearborn river, is evidently the same in which the main summit is situated. From what has been stated, it is not unreasonable to suppose that its general height near the place of crossing it with the line of the proposed Road is not more than 2,500 to 3,000 feet above the Missouri river at the mouth of Dearborn river, and as the route passes through what is termed a "*low gap*," in giving 1,700 feet for the height of that gap above the same level, its elevation cannot be considered as underrated.

If further evidence is required to show that the ridge at the gap is not underestimated it is found in the distance made by Capt. Lewis the day he passed it, which was *thirty-two miles*, being a greater distance than was made on any other day in passing from Clark's river to the Missouri.

That the elevation of the Missouri river, at the head of the Falls is also not underestimated appears to be evident when compared with that of the Yellow Stone. Lewis and Clark ascended the Missouri with canoes above the Falls a distance of 500 miles to the Upper Forks of the Jefferson branch.

At about half that distance, or 230 miles, they came to the Grand or Main Forks. There is nothing in their description to authorize the belief that the river in this latter distance falls more than about 300 feet, when compared with other streams of the same magnitude, under similar circumstances whose descent is known.

This will make the Main Forks about 3,550 feet above the sea. In the remaining distance to the Upper Forks of Jefferson river, 270 miles, the fall is greater but does not, it is supposed, much exceed two feet per mile, making the Upper Forks about 4,100 feet above the sea.

From the Main Forks Capt. Clark crossed to the Yellow Stone. In describing the intermediate ground, he states: "It now appeared that the communication between the two rivers was short and easy. The distance from the head of the Missouri at its three (Main) Forks to this place is 48 miles, the greater part of which is through a level plain: while from the forks of the eastern branch of Gallatins river, which is there navigable for small canoes, to this part of the Yellow Stone is no more than 18 miles, with an excellent road over a high dry country, the hills being of inconsiderable height and easily passable." In another place he describes the summit of the dividing ridge as about midway between the waters of the Gallatin and the Yellow Stone.

This description would make the elevation of the Yellow Stone about equal to that of the Main Forks of the Missouri, but calling it 400 feet less, or 3,100 feet it gives for the descent of the Yellow Stone to its mouth 1,000 feet, the distance being 800 miles, or one and one-fourth of a foot per mile.

The Yellow Stone is described as "large and navigable for pirogues and even batteaux, there being none of the moving sand bars which obstruct the navigation of the Missouri; while there is but one ledge of rocks, and this is not difficult to pass." The mean velocity of its current as estimated by Capt. Clark for the 800 miles, is a little over three miles per hour. Capt. Wyeth makes it about four miles per hour below the mouth of the Bighorn, but even this shows that the descent is probably less than the amount named above, and hence that the estimated elevation of the Missouri at the head of the Falls is probably rather above than below the truth.

Again, from the Upper Forks of the Jefferson river (the extreme limit of canoe navigation) which is estimated as above to be 4,100 feet above the sea, the distance across to the waters of Salmon river branch of the Columbia is 38 miles, thirty-seven miles of which is in the valley of a branch of Jefferson river which has a moderate ascent. From the summit between these streams, Lewis and Clark "followed a descent much steeper than upon the eastern side and, at the distance of *three quarters of a mile*, reached a handsome bold creek of cold clear water running to the Westward." This proved to be one of the branches of Salmon river, and notwithstanding the steeper descent, the comparative shortness of the distance from the summit, renders it probable that the elevation of this point above the sea is greater than that of Jefferson river at the other extremity of the portage; 300 feet is, under the circumstances, a low estimate for the difference. This gives for the elevation of the waters of Salmon river 4,400 feet.

This river connects with Lewis river about midway between the mouth of Malheur river and the junction of the former with the Columbia. The elevation of this latter point is 1,286 feet above the sea, and of the mouth of Malheur river, according to Fremont, 1,880 feet. The descent of Lewis river in this distance does not appear to be marked by any great inequalities, and giving to the mouth of Salmon river a mean elevation between the two points named, it is found to be about 1,600 feet; making the descent in that river from the place where it was approached by Lewis and Clark, 2,800 feet.

This descent takes place probably in about 400 miles, following the course of the stream, giving an uniform rate of seven feet per mile; a very great rate for so long a distance, through a rock bound valley, in a stream where salmon ascend the whole distance; these fish being found by Lewis and Clark near the place where they first met the waters of Salmon river.

The inference from this is that the elevation of the Salmon river valley and of the upper forks of the Missouri are not probably underestimated, a conclusion which is confirmed by evidence derived from the Journal of the Rev. Samuel Parker, who passed, in 1835, from the Green river of the Colorado, in lat. 42° N. by the way of Pierre's Hole and Henry's fork of Lewis river, into the Salmon river valley and thence to the Columbia.

From this it appears that the Salmon river where first seen by Lewis and Clark, cannot probably be more elevated than Fort Hall on Lewis river, which Col. Fremont ascertained to be 4,500 feet.

The summit passed over by Capt Clark on his return, between Clark and Wisdom rivers, and which will be called *Clark's Pass*, has probably an elevation not differing very much from that between the Jefferson and the Salmon rivers.

From Clark's river across to the forks of Jefferson river the route lies mostly through open prairie and is described by Capt. Clark as "in fact a very excellent road, and by cutting down a few trees it might be rendered a good route for wagons, with the exception of about four miles over one of the mountains which would require some levelling."

The summit at the Salmon River Pass, is 170 miles south of the Lewis Pass, and is consequently that much nearer to the most elevated points of the group of mountains of which Fremont Peak is the highest. It is perhaps reasonable to infer from this circumstance, that it is somewhat higher than the Lewis Pass, but the difference between them may not be very great.

Lewis and Clark, as they approached the Forks of Jefferson river, state that *distant snow-capped mountains are seen from the east around to the south and west;* and here it will be proper to notice, that they experienced no difficulties in traversing either of the three routes described between the waters of the Missouri and those of the Columbia, but between Clarks river and Lewis river their trials were very great. The mountains there, on their return, were covered with snow, from two to eight feet deep, for sixty miles, and destitute of game.

Mr. Parker estimates the average height of the mountains on the south side of the Kooskootskie, at about six thousand feet, the peaks of some of them reaching nearly or quite to the limits of perpetual snow. The contrast between this higher region and the ground throughout Lewis Pass, which was traversed only one week later, the clover covering the plains, and the quamash and bois rouge being in bloom, and the service berries being nearly ripe, (facts derived in part from the journals of Serjeant Gass, and Capt. Clark,) shows an elevation for the Lewis Pass lower, if anything, than is assumed in the above estimate.

If attention is directed to the map, it will be seen that the plateau or base, on which stand the Rocky mountains proper, between the waters of the Missouri and the Columbia, declines probably to the north between the latitudes of 44° and 47°. The Missouri and Clark's rivers between those parallels both flow in that direction until they reach the latitude of 47°, when the former bears to the east, and the latter to the west, indicating that in this latitude, or near it, is the line of greatest depression of the general surface; an hypothesis further confirmed by the fact that in this line are found the channels or valleys of prominent branches of both rivers, running in opposite directions, neither of which have much fall, since the waters of one (the Cokalahishkit) are "turbid," flowing mostly through low lands over a sandy and gravelly bottom, with banks "though not high never overflowed," and only not navigable because of "the rapids and shoals that obstruct its current;" and the other, (the Medicine river) in "many places deep and filled with islands," and "navigable," flowing through a level plain.

Other Passes through this portion of the Rocky Mountains are known to exist. Father De Smet mentions three. That followed by Captain Lewis is doubtless one of the number. Another which he found, in his way from the Mission of St. Mary's to the Yellow Stone, pursues evidently a very direct course to the Great Forks of the Missouri, as the distance was accomplished in seven days. He says, "we encamped the first night, Aug. 16, 1846, at the foot of the Blackfoot (Cokalahishkit?) forks. Innumerable rivulets and several beautiful lakes contribute largely to this river."

"Towards its head, to the northeast, there is an easy Pass for carts and wagons. The valley we ascended is watered by a beautiful stream, the Cart river. It was through this valley we wound our way in former days, with all our baggage to the spot where St Mary's now stands. We crossed the mountains in the vicinity of the Arrowstone fork, by an easy Pass, and descended a tributary of the Jefferson, as far as its outlet, through rather a wild, broken and mountainous country, with here and there an extensive open plain, the ordinary resort of innumerable herds of buffalo. The seventh day found us encamped in the immense plain through which the forks of the Missouri diverge."

From the main west fork of Maria's river to Clark's river, there is said to be a very feasible route, which if found sufficiently favorable is more nearly in the direct course for the proposed road, probably, than any other. The valley of Maria's river is a plain, mostly prairie, so free from obstructions that Capt. Lewis made a forced march along it (apprehending pursuit from the Indians,) of one hundred miles in eighteen hours.

To the north of this are still other Passes, two of which are described by Gov. Simpson, through one of which he travelled, though not without considerable effort, at the rate of twenty miles a day. This is in lat. 50½° N. nearly. The other more to the south, he states from report to be "greatly superior." These lead from the sources of the main branch of the Columbia and the Kootanie to those of the south branch of the Saskatshawan.

To the north of all these in the vicinity of the high peaks of Mounts Brown and Hooker, is the Athabasca Portage, on the route traversed by the Express of the Hudson's Bay Company between Hudson's Bay and the waters of the Columbia.

This Pass is ascertained by measurement to be 7,324 feet above the sea.

The three Passes last named are all north of the latitude of 49°, and are only alluded to for the purpose of illustrating the general character of this portion of the Rocky Mountains A portion which from carelessness on the part of our map makers, in not availing themselves of the information within their reach, is represented as an elevated, unbroken range of mountains, the principal streams many of them omitted or inaccurately placed; a fault which unfortunately attaches as much to the map published by order of the U. S. Senate in 1850, as to any other, although that map is, in other respects, very correct.

The examination of the several Passes through the mountains between the Missouri and Columbia rivers, will now be concluded by adverting to the fact, as evidence of their low elevation, that at the time of the visit of Lewis and Clark two numerous tribes of Indians, the Shoshones and Tushepahs were found inhabiting the entire region in question; at one season subsisting upon the salmon taken from the Salmon River branch of the Columbia, and at another pursuing the bison, and the elk on the plains of the Upper Missouri, passing to and fro between the sources of those rivers, evidently without difficulty.

Again in the vegetation of the Passes as described by Lewis and Clark, there are no plants of an Alpine character, such as would be found, in that latitude, if the elevation was much greater than is assumed, notwithstanding the softening influence of the milder temperature which pervades the region on the Pacific, and which is undoubtedly felt within the precincts of the mountains, and extends entirely through them to their eastern base. The last is certainly probable from the circumstance of the profusion of *cacti* above the Falls of the Missouri.

Sir John Richardson alludes to the similarity of the Flora of the Valleys of the Columbia and Missouri and Saskatshawan which he describes as "even greater than between the latter and the eastern parts of the United States and Canada," and which can only be satisfactorily explained by the absence of a mountain barrier sufficiently formidable to cause a difference in their organisms.

The character and numbers of the animals also which were met with in the Passes by Lewis and Clark, does not indicate so very low or severe a temperature in winter, or so very harsh or rigorous a climate, as to render them impracticable for the purposes of a railroad; nor do they indicate any greater elevation than is assumed. Wild horses were seen at the point where Captain Lewis left Clark's river, and buffalo were observed near the summit; and it was one of the well beaten roads formed principally by those animals which Capt. Lewis followed across the mountains on his return. The rattlesnake was seen at Rattlesnake Cliff, near the Upper Forks of Jefferson river, at an elevation as high, probably, as the summit of Lewis Pass, an animal seldom found in the eastern States north of the latitude of 45°.

The extract given from the journal of Captain Lewis, is very satisfactory in respect to the character of the ground between the Falls of the Missouri and Clark's river, for the construction of a railroad.

The line throughout is situated in an open valley. The surface is very regular, and free from the obstacles usually met with in the passage of summits having any very considerable elevation, and evidently presents no extraordinary difficulties.

The distance, estimating from the Falls of the Missouri is about 180 miles. The line is well supplied with timber, and the maximum gradient will not, it is believed, exceed fifty or sixty feet per mile, and that for a comparatively short distance, near to the main summit.

In proceeding westward from the summit of Lewis Pass, the first measurements met with on the route of the proposed railroad, are those made at Fort Colville on the Columbia, a short distance below the mouth of Clark's river.

The elevation of this place above the sea is given by Commander Wilkes at 2,200 feet. In another place as deduced from the temperature of boiling water, it is given at 2,049 feet. Assuming 2,100 feet as the elevation of the line at the Chaudiere Falls, ten miles below, the descent to it from the summit of Lewis Pass is 2,900 feet. 2,200 feet of this amount is assumed to be embraced in the distance to Clark's river, giving for the inclination of this portion of the line of the road an average of twenty-two feet per mile, the distance being 90 miles, which is believed to be as great an inclination of the valleys of the Cokalahishkit and east branch of Clark's river, as is demanded from the description of them by Capt. Lewis. The remaining seven hundred feet is the assumed descent of the Clark's river valley to the Columbia near Fort Colville, a distance, as estimated by the route of the proposed road, of 260 miles. This, after making a liberal allowance for the increase in distance by the channel of the river, gives for the average inclination of the river, including the "cascades and falls," which extend thirty miles from its mouth, nearly two feet per mile.

Although the mean rate of descent of Clark's river is thus found to be only from one-fourth to one-third that of the Salmon river, yet the salmon are not found in it for the reason already stated, that they cannot surmount the Falls near its junction with the Columbia.

The fact of the much greater elevation of the mouth of Clark's river as compared with that of the Salmon river, is evidence of the probable less inclination of the valley of the former.

Bradford, the author of a valuable atlas and statistics of the United States, says that "Clark's river is navigable in the upper part of its course down which boats may descend to within sixty miles of the Columbia, when it becomes so much broken as not to be navigable." Father De Smet ascended it from St. Ignatius in a bark canoe 250 miles in sixteen days, in 1845, to the Mission Station of St. Mary's, and descended the same distance in four days. St. Ignatius is about midway between Lake Kalispel and the mouth of the river.

Gov. Simpson states that he left Lake Kulspelm (Kalispel) in the morning, and thence ran down the river until eight in the evening, making probably a distance of about fifty miles, in which but one portage was necessary. From this point his party travelled by land to Fort Colville, a distance, it is supposed, of sixty or seventy miles, the last fifty miles of which was over a prairie plain.

From this account of the character of Clark's river, it is apparent that a very considerable portion of it is navigable, so much as to make it probable that the estimated descent of 900 feet along its valley to the Columbia is rather above than below the truth, seeming to confirm the conclusion arrived at from other sources, that the elevation of the summit in the Lewis Pass *cannot very much exceed the estimated amount of* 5000 *feet above the level of the sea.*

From Fort Colville it is proposed, as already intimated, to carry the line of the Road down on the south side of the Columbia river to the Chaudiere Falls or to Thompson's Rapids a short distance below, where it is supposed a bridge can conveniently be constructed without interfering with the navigation of the river. From thence it is to be continued along the valley of the river on the north side to Fort Okanagan, or to some suitable point on the Okanagan river, a distance estimated at ninety miles, but which, following the course of the river, is much greater.

The river in this distance is navigable excepting the Chaudiere Falls and Thompson's Rapids. It has a strong current and when swollen, boats descend very rapidly, making easily, with but little labor, over 100 miles per day. The descent of the Chaudiere Falls and Thompson's Rapids is given by Thornton at 50 feet the perpendicular fall amounting to 15 or 16 feet. There is an island at the first fall, and at the foot of the fall the river is 2,330 feet wide. At Okanagan it is 1,600 feet wide, and its elevation above the sea, according to Wilkes, is 2,000 feet.

In respect to the character of the surface from the eastern branch of Clark's river to Okanagan, there is little doubt of its being generally favorable. If the portion of the valley of Clark's river from the Upper Forks to the Eastern branch, as described by Lewis and Clark, is any indication of the character of the valley below, it certainly does not present any extraordinary obstacles to the construction of a railroad. The portion alluded to embraces a distance of sixty miles and is a beautiful valley, 10 to 15 miles in width, through which meanders Clark's river, increasing from 100 to 300 feet in width; its lower portion flowing over a gravelly bed, with low banks and with a current so equable as to be navigable. That the valley of Clark's river below does maintain a character not very dissimilar to this, is in accordance with the statements of Father De Smet, and the best information to be had in regard to it.

If the Columbia is crossed at the Chaudiere Falls, the line will probably leave Clark's river at some point below the Kalispel lake, and cross the wide prairie which lies between that river and the Columbia.

The banks of the Columbia between the Falls and Okanagan are described by Gov. Simpson, as "monotonous" and "sandy with rocky ridges." The course of the river is very indirect and the line may occupy ground of a different character from that which is exhibited in the vicinity of the river, either more or less favorable, but in neither case will probably require any extraordinary expense, or the adoption of any gradient exceeding about thirty feet in the mile; and the same remark will apply, also, to the portion in the valley of Clark's river. This latter portion is abundantly supplied with timber, and although the banks of the Columbia are destitute, it can easily be obtained by means of the navigation afforded by that river and its tributaries. Timber also of the very best quality, and in the greatest abundance, is found on the remaining portion of the line to the Pacific.

Between Fort Okanagan and the Pacific, or the waters connected with the straits of Juan de Fuca, the direct distance is not more than one hundred miles Intervening is the Cascade or President's range of mountains; a high range, extending, as already described, parallel with the coast from the southern limit of Oregon to the northern limit of Washington, and having several lofty conical peaks, one of which, Mt. Baker, is situated near the latitude of 49° N., and another, Mt. Ranier, in lat. 46¾° N. nearly, the latter being a little to the south of the southern extremity of Puget Sound.

Commander Wilkes of the American Exploring Expedition when at Nisqually, dispatched a party under Lieut. Johnson with instructions to explore the country across to the Columbia river.

This party crossed the mountains north of Mt. Ranier, and thence continued on in a north-easterly direction to Fort Okanagan.

Mt. Ranier was ascertained by triangulation to be 12,330 feet above the sea, while the greatest elevation attained by Lieut. Johnson in crossing the Range was found by barometrical measurement, May 27th, 1841, to be 5,092 feet, from whence Mt. Ranier bore S. S. W.

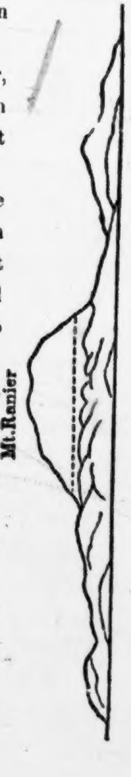
The snow is described as ten feet in depth at the deepest point on the summit, and extending altogether eight miles, the summit being five miles across. On the 4th of June Lieut. Johnson broke his barometer, his last measurement being on the eastern side of the Range, near the snow line, at an elevation of 5,203 feet.

He gives a view of the appearance of Mt. Ranier, with a portion of the Range on each side, as seen from an elevated point after passing the Range, a correct copy of which is annexed.

This view when considered in connection with the measurements decribed above, authorize the conclusion that there may be Passes in this Range, at no great distance even from Mt. Ranier, which do not exceed about 4,000 feet in elevation, or may be reduced to that amount at no very great expense.

A summit of this height will give 2,000 feet ascent from Fort Okanagan, which, if the line is carried directly towards the mountains, must be overcome in about 50 miles, at a maximum grade of probably 60 feet per mile, or, if laid obliquely, so as to increase the distance, may probably be reduced to 50 feet per mile.

On the west side of the mountains, the descent to the Pacific, if made in a direct line of 50 miles in length, gives an average of 80 feet per mile, and a maximum probably of 100 feet per mile. If it



amounts to 110 feet per mile, in any place, it will then be less than the maximum on one of the principal Railroads of the United States, the Baltimore and Ohio. This is evidently the only portion of the entire line from Lake Michigan to the Pacific requiring the adoption of what may be considered high gradients. It is however limited in extent, and being near the terminus is favorably situated for the economical use of auxilary power. The entire distance on the route as described from Chicago to the Pacific is 1,960 miles, and from the west end of Lake Superior 1,600 miles. These distances are 12 per cent greater than the direct distance between the points named, to cover the necessary deviations from a direct course.

The remarks above are predicated upon the supposition that no lower summit can be obtained than is assumed of 4,000 feet. The *sketch* presented affords encouragement of a still lower summit, even upon or near the direct route. This, in addition to the fact in which all the authorities concur, that the lat. of 48° N. is the limit or boundary between the trap and granite formations, indicates the possibility of a favorable change in the elevation of the Range at that point. Near this line also, are the valleys of the Barriere and the Tuxpam rivers, the former a tributary of the Columbia, and the latter discharging into the Pacific, circumstances favorable and encouraging in respect to finding a lower pass for the Road.

Again it appears from the surveys made by the exploring expedition that the latitude of 49° N. (the international boundary) is only five miles south of the mouth of Frazer's river, where it meets the Pacific.

Frazer's river, like the Columbia finds its way to the sea through an opening in the Cascade Range, and from its nearness to the line of 49°, there is reason to infer that the Range may be in a good measure avoided and still keep the road within the limits of the United States.

In respect to the selection of a point for the terminus of the proposed Road a few words only will be necessary.

That point which possesses the requisite facilities in respect to harbor accommodations, on a large scale, and in the highest degree, with ground the most suitable in elevation and extent for the site of a city of the first magnitude, with a country in the vicinity the most fertile, intersected by streams which afford abundance of water and of water power, and which withal is nearest to the entrance from the ocean by the Straits of Juan de Fuca, is the best.

This last consideration, that of a convenient communication with the sea, is important to enable vessels, particularly coasters, and others running between the ports on the Pacific south, and and those situated to the North and in Eastern Asia, to enter and receive and discharge freight and passengers with the least possible loss of time, and with the least expense.

Puget Sound, therefore, it will be seen, is too far south for this purpose, and the proper point must be sought for on the eastern shore of Admiralty Inlet, near its northern extremity; or between this latter point and the international boundary, in what is termed the Archipelago of Arro.

ESTIMATE OF COST.

The portion of the line embraced in the States of Illinois and Wisconsin, 70 miles in one, and 290 miles in the other, being in a course of construction will not be included in this estimate.

This portion completed for a single track and equipped ready for use will probaly cost not far from ten millions of dollars.

The length of the remaining portion from the west line of Wisconsin to the Pacific as estimated, is 1,600 miles.

The cost of this for a single track complete, with the requisite turn-outs, the iron rails weighing 100 lbs. per yard, with all the necessary buildings and equipments is estimated as follows:

From the Wisconsin line to Red River the point of divergence of the branch to Lake Superior, 220 miles at $40,000,	$8,800,000
From Red River to the Great Falls of the Missouri, over the Missouri plains, the surface being very favorable, and distance 720 miles, at $45,000	32,400,000
From the Great Falls of the Missouri to Okanagan river, over ground more difficult of construction and access, 530 miles at $60,000,	31,800,000
From Okanagan to the Pacific, including the passage of the Cascade mountains, 120 miles, at $70,000,	8,400,000
Forward	$81,400,000

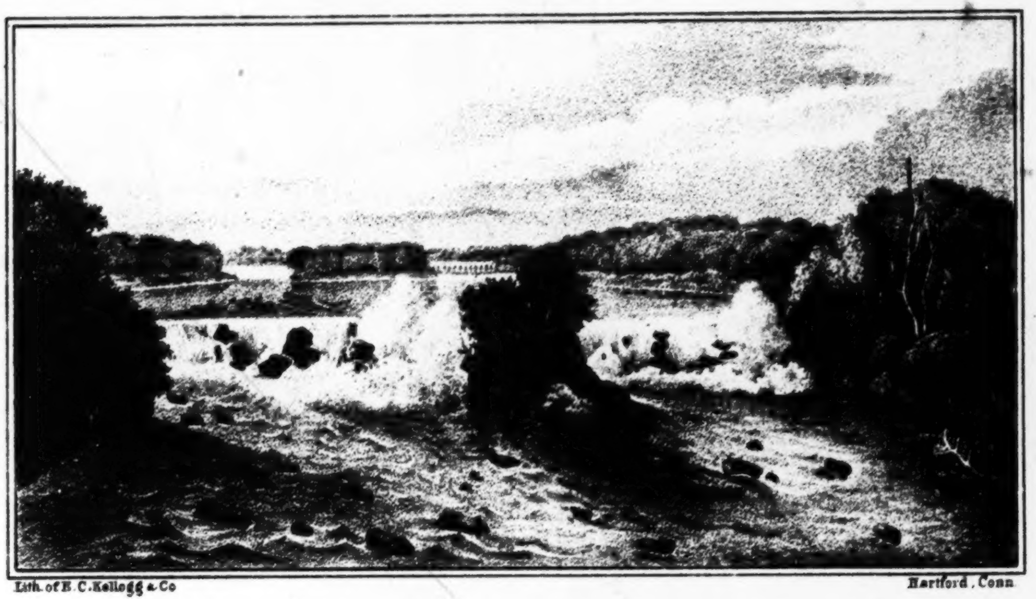
Amount brought forward,	$81,400,000
Add cost of branch to Lake Superior, 220 miles, at $40,000,	8,800,000
	$90,200,000
Contingencies, add	9,800,000
Total for 1820 miles,	$100.000,000

equal to $55,000 per mile average.

The branch to Lake Superior is supposed to diverge from the main line at the Red river; thence across the *Hauteurs des terres* to the Mississippi, at the mouth of Crow-wing river; thence in the vicinity of the Mississippi river to where it bends to the north; thence passing near Sandy Lake to a terminus at the west end of Lake Superior, where its elevation above the sea is supposed to be about 630 feet.

So favorable is the surface of the country generally along the proposed Northern route to the Pacific, that a road of the same character, if located east of the Mississippi, could be built and equipped complete, at a cost not exceeding $40,000 per mile The addition to this amount of upwards of thirty per cent. is believed to be sufficient to cover the extra cost of transportation of materials and provisions, and the other disadvantages incident to the construction of the road through a country, the most of which is in a state of nature, having no other facilities of intercommunication than are presented by the navigable waters of the Mississippi, Missouri and Columbia; facilities which are indeed of very great importance, and which will contribute largely to diminish the cost of the road on the route in question.

The actual cost of the Road will depend very much upon the time occupied in its construction. The revenue to be derived from it will be limited until the entire line is completed. It will be an object therefore to accomplish it in the shortest time possible consistent with a due regard to its cost. If immediately commenced and prosecuted with abundant means, it is not probable



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THE FALLS OF ST. ANTHONY.
Mississippi.

that it can be accomplished in less than from ten to twelve years, delays caused by negotiations with the Indian tribes not included. During this period if we may judge from the past, the increase in the population of the United States will not be less than ten millions, a large portion of which increase will undoubtedly be found located on and near the line of the proposed Road. So that by the time it is completed it will have a way business of some amount which will thence forward be constantly augmenting and form ultimately a prominent item in the revenue of the Road.

CLIMATE, SOIL AND PRODUCTIONS.

The portions of the States of Illinois and Wisconsin through which the proposed route passes are perhaps unsurpassed in fertility of soil and healthfulness of climate by any other region of equal extent in the United States.

The former is now too well known to need any especial notice in this place. As it respects the latter, the fact of an increase in its population of nearly half a million of souls in the last ten years, and the unexampled advance in the value of real estate within its limits, is evidence that in all the essentials which serve to render it a desirable habitation for man, it is not excelled by any other of the States of the Union.

In addition to its capabilities as an agricultural region, its southwestern portion is rich in the ore of lead to a degree unparalleled; more than forty millions of pounds being now sent to market annually; the business of mining being still in its infancy, only waiting the influx of capital and the facilities of communication, now in progress, to be greatly augmented.

The northern portion is equally rich in copper and iron, and also in timber. These valuable resources, combined with its salubrious climate, and exceedingly advantageous position, being bounded by the navigable waters of the Mississippi on one side, and by those of Lake Michigan on the other, and Lake Superior on the north, give assurance that Wisconsin is destined soon to occupy a position in the rank of the most populous and influential States of the Union.

The territory of Minnesota through which the proposed route passes from its eastern to its western limits, and in which is located the branch to Lake Superior, although situated to the north and west of Wisconsin, with its surface more elevated above the level of the sea, possesses for the most part a fertile soil, capable of yielding largely under proper culture, and has also a very healthful climate. It has, moreover, a bountiful supply of timber in its eastern and north-eastern portions, and is doubtless rich in copper, iron and coal, and is in all respects well adapted for the purposes of a residence for man, and has from the great similarity of its climate and character of its productions, justly received the appellation of the *New England of the West.*

The mean elevation of its surface above the level of the sea is about 1,200 or 1,300 feet; the highest ground within its limits being that of the Coteau du Missouri, over which the line of the proposed road passes, and which is from 2,000 to 2,300 feet above the sea, forming there the highest or culminating point, as already stated, in the great plain which stretches from the Gulf of Mexico to Hudson's Bay. This highest ground has only one-half the elevation of the prairie plains at the base of the mountains about the sources of the Platte and Arkansas, a difference, in its effect on temperature, equivalent to seven or eight degrees of latitude.

Of the capabilities of Minnesota as an agricultural region, a very correct idea can be formed from the statements of those who have explored it and resided within its limits.

Its central portion is represented by Nicolet as "a most beautiful tract of land diversified by hills, dales, wood-lands and lakes, the latter abounding in fish." From the most elevated points "grand views are presented" "There can be no doubt," he states, "that in future times this region will be the summer resort of the wealthy of the land." The valley watered by the Tchansansan or James river is described as an "immense prairie, deemed by travellers, perhaps, the most beautiful within the territory of the United States."

The valley of the St. Peters presents "a level country interrupted by moderate undulations of the surface and beautified by intervening prairie, tracts of wood-land, and lakes." The river "has gently sloping borders divided into natural terraces, covered by a luxuriant grassy sward."

The valley of the Mississippi from the Falls of St. Anthony is "wide, with river banks of moderate elevation, forming a retreating succession of terraces, delightful to the view," ornamented with a variety of timber.

Farther up, about the *Hauteurs des terres*, "the forests are more varied and the surface is variegated with a great number of lakes." The valley of Red river has already been described, and its beauty and fertility noticed. The portion lying west of the James and Red rivers and embracing the vast plateau of the Coteau du Missouri has already been described as destitute of trees. This is attributable mainly to the elevation of its surface, and the absence of streams of sufficient size to check the advance of the fires which sweep annually over all the wild prairies of the west. It is this cause, more than any other, which has denuded them of their timber, and prevented its growth, since, wherever the fires have been prevented by the improvements which have been made, in fencing off portions for cultivation, a spontaneous and vigorous growth of timber succeeds. It is therefore, not unreasonable to suppose that in time there may be, in all the fertile portions of the prairie plains of the west, a fair supply of timber both for ornament and use.

Capt. Jona. Carver, who, more than eighty years ago, spent three years on the Upper Mississippi, gives substantially the same account of the country as Nicolet. He states that "the river St. Pierre flows through a most delightful country abounding in all the necessaries of life At a little distance from the river are eminences from which you have views that cannot be exceeded," a country which promised, in his opinion, at some future period "to be an inexhaustible source of riches to that people who shall be so happy as to possess it."

In looking abroad over the vast and fertile region before him he seems to have been deeply and justly impressed in regard to its future destiny, for we find him indulging in the following remarks: "To what power or authority this new world will become dependent after it has arisen from its present uncultivated state, time alone can discover, but as the seat of empire from time immemorial has been gradually progressing towards the west, there is no doubt, but that mighty kingdoms will emerge from these wildernesses, and stately palaces, and solemn temples with gilded spires reaching to the skies, supplant the Indian huts whose only decorations are barbarous trophies of vanquished enemies."

Col. Long, who explored the region from the Upper Missouri to the Red river of the north in 1822 and 1823, states that at Pembina, one of the Selkirk villages situated on the Red river in the latitude of the northern boundary of Minnesota, "agriculture is attended wtih success, wheat, barley, millet, pulse, potatoes, and other culinary roots" are cultivated.

Gov. Simpson, in his journal of a tour to the Pacific already referred to, in speaking of the valley of the Red river at Fort Garry, 80 miles north of Pembina, describes it as being, on the west side of the river, one vast prairie, and on the other side as wooded with birch, oak, elm, and pine. That the soil yields forty bushels of wheat to the acre, and even after being cultivated twenty years, yields fifteen to twenty-five bushels per acre.

He describes the summers "the same as in Canada, though not quite so long." "Cattle maintain themselves in the settlements seven months, and are maintained five months." He says also that the shores of the Lake of the Woods are fertile, "bringing in maize to perfection."

Sir John Richardson states that the vegetation in the valley of Red river, 1,000 to 1,200 feet above the level of the sea, is similar to what it is in the State of New Hampshire at the same elevation. The difference in latitude of these two portions of the country being not less than about five degrees, equal to 350 miles nearly in distance.

Schoolcraft informs us that "corn is a profitable crop at Red Lake (which is situated north of the Hauteurs des terres,) and has for many years been furnished in considerable quantities from this lake to the posts on the Upper Mississippi, and even as far east as Fond du Lac." The specimens of grains, etc , from Minnesota now on exhibition at the Crystal Palace in New York, are very conclusive evidence of the agricultural capabilities of the portions of the territory under cultivation.

Capt. Pope who conducted the explorations made in Minnesota, by order of the Government, in 1849, after stating that the Mississippi was navigable nearly 400 miles in Minnesota; the Red river the same distance; the St. Peters 120 miles, an improvement being required at one point only; and the Jacques river nearly 200 miles; remarks, that "nature has been more lavish in her gifts of soil than in her channels of navigation." The numerous lakes between the Mississippi and Red rivers and St Peters are "surrounded by a gently undulating country of the most fertile character, and abundantly supplied with all of the forest trees common to so northern a latitude" He traversed the territory north and south 500 miles, and "with the exception of a few swamps saw not one acre of unproductive land." "The soil is the black mould several feet in thickness, with various proportions of sand sufficient to give the necessary warmth."

Capt. Pope "knows of no country where so many advantages are presented to the farmer and manufacturer." He thinks the climate on the south and east slopes of that portion of the territory similar to that of Iowa or Western Illinois. The valley of the Red River he states, "is alluvial in its formation," and "presents in its whole extent (300 by 150 miles) an "almost unbroken level of rich prairie intersected by the heavily timbered tributaries of the river," the main river itself being also "heavily timbered on both banks with elm, oak, maple, ash," &c. This valley, he states "is among the finest wheat countries of the world." The pine is not found within its limits, but the oak and elm "attain a size which he had never seen elsewhere."

He describes the valley of the Mississippi above the Falls of St. Anthony to be remarkably productive, and thinks he is "not too sanguine or enthusiastic" when he affirms, that no state or territory in the West presents so many or such remarkable advantages to the farmer or manufacturer;" and he is "convinced, that those who may be induced by the perusal of his report to emigrate to the territory of Minnesota, will find their anticipations more than realized;" and that he has said too little in its favor rather than too much.

In respect to climate, all the authorities concur in stating that Minnesota and the region west to the mountains possesses in general a very pure atmosphere, dry and bracing, remarkably salubrious, and a temperature, although at times tending somewhat to extremes, is not on the whole unfavorable to the growth and maturity of both animals and vegetables.

Although as a general rule the average annual temperature of places upon the earth's surface diminishes as the distance from the Equator or latitude increases, this relation is frequently varied by local and other causes, such as proximity to mountains, and to the sea or large bodies of water, the elevation above the ocean level, the direction of the prevailing winds, and character and temperature of the surface over which they pass.

The mean annual temperature of places on our Atlantic coast is known to be eight or ten degrees lower than it is in places in the same latitude upon the western coast of Europe. Paris which is in latitude 48° 50′ N. has the same mean annual temperature with New York City which is in latitude 40° 42′ N.

If a line be drawn from the Atlantic coast westwardly, passing along that part of the surface of the country which has a mean annual temperature of 50° F. it will commence at or near Providence, R. I., thence run south-westerly, curving northwardly into the larger valleys, reaching as far as Newburg on the Hudson and Harrisburg or Sunbury on the Susquehanna, and in its south-westerly course rising as it proceeds, until it attains an elevation which will carry it across the Alleghanies to Pittsburg, which is 700 feet above the sea.

From Pittsburgh it continues through the central portions of Ohio and Indiana to the Illinois line. Thence inclining more to the north, and curving into the Mississippi and Missouri valleys it crosses the latter near the mouth of the Sioux river, from whence it sweeps around to the south-west along the surface of the vast inclined plain which forms the western slope of the Mississippi valley, rising as it proceeds, to some point where its elevation is high enough, and the Rocky Mountains are low enough, to allow it to pass over on to their western slope. Thence by a very irregular line, caused by the deep valleys and high mountain ranges, which are found west of the main range of mountains, in a north-westerly direction, probably by the valley of Lewis river and thence to the Pacific at a point, a little north of the latitude of 49°.

If the line of temperature of 45° F. be traced in like manner, it will be seen to commence at a point on the coast east of Boston, thence south-westerly by a similar line to that above described, curving further up the valleys of the Connecticut and the Hudson, reaching to Fort Edward on the latter; thence passing along the north slope of the valley of the Mohawk, across to the valley of Lake Ontario, and along the east and north sides of that lake. From thence across the Canadian peninsula to Lake Huron and across that lake, the State of Michigan and Lake Michigan to Green Bay in Wisconsin.

From Green Bay it curves to the south in its passage to the Falls of St. Anthony, on the Mississippi where it crosses that river. Thence it takes a south-west course curving again somewhat to the north in passing the Missouri and thence along the western slope of the Missouri and Mississippi valleys at a higher elevation than the line first named of about 1,700 feet.

To the south of the line thus described is an isolated portion or zone of the Appalachian chain of mountains which has a maximum temperature of 45°, a feature in which this line differs from the one first described.

If the isothermal line of 40° be traced, it will be found to differ very widely in places in position from the line of 45°. It will commence near the head of the Bay of Fundy, thence south-westerly passing south of St. John, N B. From thence it will be deflected successively to the south by the mountains of Maine, New Hampshire and Vermont, to the valley of Lake Champlain. Thence along the western slope of the Green Mountains northerly, crossing the valley of the St. Lawrence in Canada and thence westerly along the valley of the Ottawa north of Lake Huron and near to the north shore of Lake Superior. Thence to the north and east of Rainy Lake and the Lake of the Woods, to the south end of Lake Winnipeg. Thence westerly across the prairie plains of the Saskatshawan, passing to the north of the south branch of that river, and curving around to the south as it approaches the elevated country near the Rocky Mountains, at the sources of the Missouri, where if not elevated enough to pass through the depression which there exists in the mountain chain, it will take an easterly course, doubling the Wind river or Black Mountains, and like the lines already described, will go on south increasing in elevation until it finds some opening about 1,600 feet higher than the last, through which it can enter the valley of the Rio Del Norte or Colorado, and thence ultimately into that of the Columbia.

The three lines of temperature above described, will be found, all of them, to terminate on the Pacific shore to the north of the national boundary, the mean annual temperature at the mouth of the Columbia having been ascertained, by observations to be about 55°, while that of Puget sound is but little different, a temperature as mild as that of Baltimore on the Atlantic, and said to be more equable, so great is the difference and so much milder is the climate on the Pacific than it is on the Atlantic coast.

These isothermal lines or lines of equal temperature will exhibit more irregularities west than east of the Rocky Mountains, owing to the number and elevation of the mountain ranges into which the surface of the country is broken, and will present more isolated districts or zones differing in temperature from other districts lying either to the north or to the south

A correct chart exhibiting these lines of uniform temperature would be a very interesting addition to the stock of geographical knowledge, a desideratum which cannot be fully realized, until observations have been sufficiently multiplied for the purpose.

To return now to Minnesota.

The mean annual temperature of Fort Snelling, by a series of observations, as already stated, has been acertained to be 45°. This is the temperature narly of Portsmouth, N. H., of Windsor, Vt., and of Oxford and Cherry Valley, New York.

On the *Haut terres* of the Mississippi, at Itasca Lake, the most elevated of the many crystal sheets of water that gem that portion of the State, M. Nicolet found the mean temperature to be 43½° F. and he says that, "having taken great pains in determining the temperature I have a right to believe that it represents pretty accurately the mean annual temperature of the country under examination."

This is the mean temperature of Burlington, Vermont, where the elevation above the sea is only 346 feet, and is three degrees milder than the temperature of Williamstown, Vermont, which has the same elevation above the sea as Itasca Lake.

From this it is inferred that the mean annual temperature of Minnesota is no lower, and is in all respects equally favorable with Vermont. Of the character and capacity of the latter as an agricultural region there is of course no doubt, and there should be none in respect to Minnesota. For the growing of grains, and for grazing it will be found to be surpassed by but few other States in the Union.

The temperature at the sources of the Mississippi as ascertained by M. Nicolet is in accordance with the temperature of other places lower down in the Mississippi valley. At Baton Rouge for instance in lat. 30° 28′ N. the mean temperature is 65° 10′ F. At St. Louis lat. 38° 36′ N. it is 53°′ 50′ F. the elevation above the sea 400 feet, and at Itasca Lake lat. 47° 14′ N. elevation 1575 feet above the sea, it is as stated, 43½° F. equal to about 44′ of latitude or 50 miles nearly along the slope of the valley for each degree of temperature.

Seymour, in his "Sketches of Minnesota," informs us that "early frosts in the latitude of St. Anthony appear to be uncommon. Frosts seldom occur before the 15th to 20th September, or 1st of October." He names a gentleman now a resident of Minnesota, formerly from Galena, Illinois, who was "delighted with the climate and thought it superior to Northern Illinois, as it was not subject to sudden changes." He states that he has heard "the same views expressed by many settlers in Minnesota who formerly resided some four or five degrees further south." He says also that "the climate is well adapted to corn, wheat, barley, oats, pulse, etc.," and that "the potatoes are of a quality superior to those raised in the Middle States." That "many farmers say their cattle have a dry coat in winter and suffer less from cold than in a warmer climate," and that cattle ran at large the preceding winter in lat. 46 N. and were in a thriving condition in the spring."

Mr. Schoolcraft in a more recent work than the one already referred to, reaffirms his previous statement. He says that "the *Zea Mays* is raised in great perfection in the valley of the Red river and of great lake Winnipeg, which is north-west of the Mississippi. In the settlements of Lord Selkirk the grain crops are unfailing." "Indian corn, which cannot be cultivated at Sault St. Marie in lat. 46½° N., is raised by the Indians annually, and ripens early in August at the very sources of the Mississippi, and at Red lake north of them. The latter point is very near the latitude of 49° N."

"It is certain," he states, "that the extreme upper Mississippi escapes those icy winds from Hudsons and Baffins Bays which are often felt during the spring months in Northern Michigan and Northern Wisconsin."

M. Nicolet states that of all the Indian nations visited by him "the Chippeways inhabiting the country about the sources of the Mississippi, are decidedly the most favored Besides their natural resources of fish, wild rice and maple sugar, with the addition of abundance of game, the climate is found to be well adapted to the culture of corn, wheat, barley, oats and pulse The potato is of a superior quality to that of the Middle States of the Union."

More has been said upon the temperature and climate of Minnesota for the reason that whatever character its possesses in this respect has an important bearing upon the estimate to be formed of the climate of that portion of the proposed route embraced in the valley of the Upper Missouri, and included within the limits of what is still designated as the Missouri or Northwest Territory. This region, or the portion of it through which the proposed route passes, is in the same latitude with the *Haut terres* of Minnesota, lying in a direction from them nearly due west.

Pursuing this line to the Pacific it meets the coast where the mean temperature is 55°, or 11½ higher than at the *Haut terres* of Minnesota, an amount considerably greater than is due to any difference in elevation compared with the sea level; from 300 to 350 feet of elevation causing a difference in the mean temperature of one degree

With no local causes to influence the temperature, it would be very proper to assume a gradual amelioration in proceeding westward from the Haut terres, particularly after leaving the Coteau du Missouri. Owing, however, to the gradual increase in the elevation of the country, in part, and in part to the nearer approach to the mountains, an average of 41° or 42° for the region in question, corresponding to the temperature of St. Johns in New Brunswick, Halifax, N. S., Eastport, Maine, or Montreal, C. E., is believed to be a very fair estimate.

Lewis and Clark who wintered at the Mandan village, do not represent the weather as being on the whole severe, although at times extremely cold. They state that the "Rickarees cultivate Indian corn, or maize, beans, pumpkins, water melons, squashes, and a species of tobacco peculiar to themselves," productions similar to those raised in the valleys of New England. On the 22d October a party of Sioux arrived with "no other covering but a piece of cloth or skin about the middle." Cold weather set in the last of November, and on the 7th December the river was closed by ice. During the latter part of December the weather was moderate. It was cold again from the 3d to the 14th of January. After that moderate and pleasant to the breaking up of the ice in the river on the 26th of March. On the first of April was a heavy fall of rain, noticed as the first of any consequence which had fallen since the 15th of October. The deer, the elk and the buffalo were found on the prairies during the whole winter. On the 13th of February fifty-nine of these animals were killed, their condition of course not as good as in a more favorable season, but the fact that they are able to subsist on the open prairies, is indicative of a very mild climate for so high a latitude.

Gov. Simpson in describing the productions at Fort Carleton, on the Saskatshawan river, lat. 52° 51′ N. 600 miles west of Red river, and 1,100 feet above the sea, says, that "the country in the vicinity produces potatoes and other vegetables. Wheat succeeds sometimes." At Edmundton, lat. 54° N. on the same river, near to the Rocky Mountains and north of the lofty peaks of Mounts Brown and Hooker, he states, that "potatoes, turnips, and other hardy vegetables are grown, but the wheat is destroyed by the early frosts."

He informs us also, that the buffalo are "incredibly numerous" in that region, and that in 1829 he "saw *ten thousand* mired in a single ford of the Saskatshawan."

This region is over *four hundred miles to the north* of the route proposed for the Pacific Railroad, a difference as great as that between the cities of New York and Quebec.

At Fort Union, at the mouth of the Yellow Stone, where there is a post of the American Fur Company, the productions of the soil do not differ much from those at the Mandan villages. A gentleman residing in Missouri, relates on the authority of one of the partners of the American Fur Company, that "the Missouri at that place freezes over about the first of December, and opens about the middle of March. The Upper Missouri among the Blackfeet, being sheltered by the mountains, *opens a little earlier, and the winter in that section is somewhat milder.* With regard to the vegetables it depends very much upon the character of the season, whether regular, or wet, or dry. Success depends upon this. Sometimes they have two months without rain, and then long spells of rain. The Indians cultivate what is called the six weeks or Canadian corn, and also some of the garden vegetables

The soil varies, some of it is excellent, especially in the valleys; but on the plains there is less soil. The grass is burned over twice a year, and remains green under the snow, and the cattle are not sheltered or fed, but dig away the snow and the cattle feed themselves. The winters are probably about the same as in Northern New York. *Were the fires kept out the timber would grow as on our Western Prairies.*"

The descriptions above given, including that of Lewis and Clark of the country about the Upper Missouri do not differ from that of Catlin, who spent some time at the mouth of the Yellow Stone, and at the Mandan villages.

The character of the vegetation of the Upper Missouri, as described by Lewis and Clark and others, is evidence of its suitableness for agriculture. Even in close proximity to the mountains, the climate is milder than at the mouth of the Yellow Stone, and there is nothing in the quality of the soil to prevent its being an excellent grazing country. On the plain, above the Great Falls, in the vicinity of Medicine river, where the soil is represented as more thin and gravelly, the grass was nine inches in height, and the cactus was in bloom; berries of various kinds were abundant and the buffalo were numerous.

Following up the main river, three hundred miles from the Falls, the grass upon the river bottoms was one and a half to two feet in height. Gooseberries, service berries and several varieties of currants were abundant all along the river. A species of flax was likewise seen, and the sunflower also, and this vegetable was observed to flourish at least one hundred and sixty miles nearer to the highest and snow-capped portions of the Rocky Mountains, than it is proposed to approach them by the Railroad.

Farther to the north, between the two branches of the Saskatshawan, Father De Smet says that the country adjacent to the mountains is "extremely fertile, abounding in forests, plains, prairies, lakes and streams. Forests of pine, cypress, etc., occupy a large portion of it, covering the declivities of the mountains, and branches of the river."

"The country is capable of supporting a large population, and the soil is suitable for the produce of barley, corn, potatoes and beans, which grow here as well as in the more southern countries. *An active and enterprising population are destined to fill this spavoid, and flocks and herds will graze on the beautiful meadows and plains of this extensive region.*"

The extract from the journal of Capt. Lewis, already given, confirmed by the statements of Sergeant Gass, relating to the Pass from Clark's river to the Missouri, when carefully examined, must produce conviction of its entire practicability for the purposes of a railroad, and that the temperature or climate cannot, in any portion of it, be much more severe or intolerable than is experienced during the winter season on some of the mountain passes where railways are now uninterruptedly conveying passengers and freight in the northern portions of New Vork, Vermont and New Hampshire.

On entering the valley of Clark's river, we find a region where there is a rich vegetation. It was here that wild horses were seen by Captain Lewis, and they were represented by the Indians to be numerous. This region is now known by the name of the "Horse Plain," and it is here that the Mission Station of St. Mary is situated.

All accounts agree in stating that this valley is well timbered. Bradford represents the river as flowing through "extensive and fertile valleys and level plains."

Mr. Schoolcraft in a recent communication to the public respecting this portion of the Great Valley of the Columbia, describes it under the new name of "*El Hara*," as well timbered, with a productive soil, a favorable climate and capable of supporting a large population.

This also is the character given of it in Irving's Astoria.

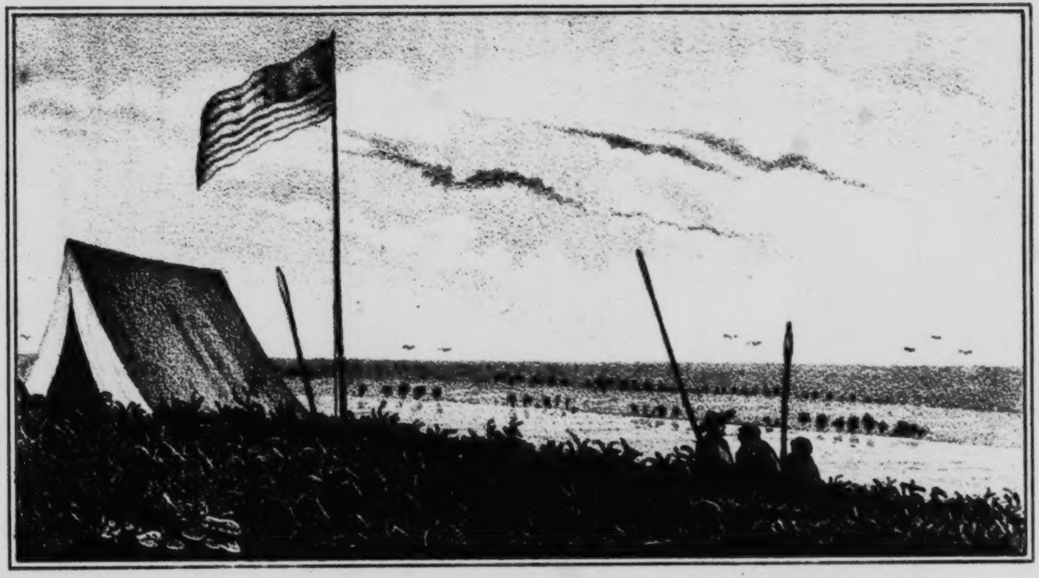
Although elevated on the average twenty-five hundred feet above the level of the sea, in latitude 47° to 48° N., it has not a very rigorous climate. A series of observations continued through three years at Lapwai, in Middle Oregon, lat. 46° 27′ N., long. 118° W., gives for the mean annual temperature at that place 53⅕° F.

Fort Colville is in the same valley in lat. 48° 37′ N. The distance and difference of elevation being both taken into account, will make the mean temperature of Fort Colville about 48°, the same as Albany or Troy in New York, and give for the mean temperature of the Clark's river valley about 44°, the same nearly as Green Bay, Wisconsin, Cherry Valley, N. Y., or Dover, N. H.

Com. Wilkes, states that Lake Kalispel is thirty-six miles long and eight wide. The country around is rich and beautiful, covered above and below with pines and spruces, with occasional spots of rich bottom land. At the forks 50 miles above, according to Farnham, is a post of the Hudson's Bay Company. He states that "a rich and beautiful country spreads off from Lake Kalispel in all directions," and that the "*ridges*" which separate the sources of the Clark's river from those of the Missouri and Saskatshawan, "are said to be *easy to pass*."

The Mission Station of St. Marys, already spoken of, is situated in the upper part of the Valley of Clark's river, on the main south branch, which Father De Smet calls the St. Marys, for the reason that the north branch, which passes through Flathead lake, being the longest, is properly the main river. This latter, he says, is a beautiful stream, flowing through a "delightful valley" of 100 miles in extent north of Flathead lake.

The soil at St. Marys he adds "yields abundant crops of wheat oats and potatoes. The rich prairie is capable of supporting thousands of cattle. St. Marys, or Bitterroot Valley, two hundred miles in extent, is one of the finest in the mountains. In the cultivation of the soil irrigation is necessary in consequence of the long summer drought that prevails, commencing in April and ending only in October."



GREAT SAVANNA, RED RIVER OF THE NORTH.
From Owens Geological Survey.

"This difficulty, however, if the country should ever be thickly settled can be easily obviated as the whole region is well supplied with numerous streams and rivulets. These remarks apply also to the valleys contiguous to the St. Mary's. The streams contain abundance of fish, especially trout."

The Mission Station of St. Ignatius is situated on the north side of Clark's river, thirty to forty miles from its mouth, just above the portion which is "obstructed by insurmountable Falls and Rapids." It stands on a "beautiful prairie of three miles in extent, surrounded by cedar and pine."

Between Clark's river and the Spokane, and leading towards Colville, is a "beautiful valley, agreeably diversified by plains and forests." The upper portion of the Spokane valley is of a similar character, the trees attaining an immense size, but lower down it is denuded of timber, a character which appertains to the high plains of the Columbia, which spread off south towards the Lewis river.

The air of this whole region is pure and bracing, and the climate excellent. In all the upper portions of the Columbia valley it has the same character. The soil is good, though in some places light, and "the declivities of the mountains are studded with inexhaustible forests, in which the larch tree, pine of different species, cedar and cypress abound."

Joseph Dunn who was some time in the service of the Hudson's Bay Company states that "the country of the Flatheads presents a pleasing diversity of woods and plains, valleys and mountains, lakes and rivers, and is well stocked with deer, mountain sheep, beavers, otters, martins, wolves, lynxes, etc., wild fowl and fish, besides esculent roots, so that they have abundant means of subsistence and clothing, and of traffic as well."

From the mouth of the Yellow Stone, as far west as the Columbia, the country is now possessed mainly by three very numerous and powerful tribes of Indians, the Crows, the Blackfeet, and the Flatheads, as they are commonly called, although not entitled to that name from any custom they have of flattening the head which is only practiced by some tribes nearer the Pacific. The Crows occupy the country drained by the Yellow Stone and its tributaries. The Blackfeet, that of the Upper Missouri, extending across to the Saskatshawan, and the Flatheads the valley of Clark's river, and country adjacent to the north and south.

These tribes may properly be considered as among the first, if not the very first, of the tribes of North America. Their persons are finely formed, they possess great intelligence and practice many of the virtues of civilized life. They live in a country and a climate which they consider delightful, where game of all kinds abounds, and where the greatest ills they suffer are those consequent upon their inter-tribal feuds, and contact with the Whites; or rather with that portion of the Whites who with more than savage appetites for what is vicious and base, flee the limits of civilization, and inflict by their example and otherwise, upon the untutored Indians, an amount of evil the magnitude of which cannot easily be computed.

The fact that the tribes named possess the character above described is evidence of the favorable soil and climate and great productiveness, of the region of country which they inhabit, and of its capabilities for the development of animal life, and for sustaining a large population.

At Fort Colville, as stated by Wilkes, "wheat is the grain most cultivated, being considered more profitable than oats, barley or rye. Indian corn (Zea mays) succeeds here admirably."

Gov. Simpson who crossed the Rocky Mountains, as already stated, some distance north of the national boundary, describes the country along the Kotoonais, and across to the Kalispel lake, as densely wooded, the forests in many places intricate and difficult to penetrate. On the *Grand quête* branch of the Kotoonais he saw "sixteen sorts of pine" and "twelve different kinds of berries." Soon after passing the main summit, on the west side of the mountains, he saw "recent marks of the *buffalo*, antelope, sheep, moose, and red deer."

From the Kotoonais river he passed across to Clark's river valley, which he describes as "well covered with excellent timber, bounded on either side by a line of lofty hills, soil rich, and stream navigable, except at one cascade where a portage was necessary."

He informs us that the wheat grown at Fort Colville "weighs 63 to 65 lbs. per bushel. Maize flourishes but does not ripen until September. Peas, potatoes, oats, barley, melons, cucumbers, etc., are plentiful. The winter is many degrees milder than in the same parallel on the eastern side of the mountains." "Amongst the wild flowers in the neighborhood of the Fort are the helianthus, lupin, monks hood, and the fuschia, in great abundance." This latter particularly denotes a mild climate, and for ground elevated over 2,000 feet above the sea and near to the latitude of 49° N. shows a great difference in the temperature between the eastern and western sides of the continent. From the crops raised in the vicinity of Fort Colville most of the posts of the Hudson's Bay Company at the north get their supplies.

At the Chaudiere Falls salmon are taken in great numbers, as they are in all parts of the Columbia below. They ascend quite to the head of the main river, and will form a very important source of wealth to the country. This remark also applies to the waters connected with the straits of De Fuca, which are very richly stored with fish of all kinds.

From Fort Colville to Okanagan in the valley of the Columbia, the climate and temperature does not vary much from that of Fort Colville, the causes which have influence on both being nearly the same; but between Fort Okanagan and the Pacific are the Cascade Mountains, a serrated Range about 5,000 feet high with three or four conical peaks in the territory of Washington, rising to more than double that height. These latter only are covered with perpetual snow, the remainder of the Range is clothed with a dense forest to its summit. There are, doubtless, some twenty miles perhaps of the estimated entire distance of 130 miles, where the temperature is too low and the snows lie too long to render it available for other than grazing or pastoral purposes. This Range although having, undoubtedly, a milder temperature than is found in the Rocky Mountains at the same elevation, and in the same latitude, yet from its exposed position is subject to snows of greater depth and to frequent and greater changes of temperature.

The mean annual temperature of 48° F. which is found in the valley of the Columbia at an elevation of 2,000 feet above the sea undoubtedly prevails in the same latitude on the west side of the Cascade range at an elevation of nearly 3,000 feet, and from that limit to the shore of the ocean goes on increasing until it reaches 53° or 55° as ascertained approximately by Com. Wilkes.

In the region between the Cascade Mountains and the Pacific, a temperature prevails which is even milder than in the same latitude on the western coast of Europe. Paris, which is situated in latitude 48° 50′ N. has a mean annual temperature of only 51 6-10° F. or four or five degrees less than is found in the same latitude in the waters of the straits of De Fuca. Proceeding northward along the Pacific coast the same relatively mild climate continues. Wheat, barley, potatoes, and turnips are all grown at Fort Alexandria, two hundred and fifty miles north of the national boundary.

In Irving's Astoria the mildness and equability of the climate west of the Rocky Mountains in the valley of the Columbia is noticed as remarkable. "The rigorous winters and sultry summers and all the capricious inequalities of temperature prevalent on the Atlantic side of the mountains are but little felt on their western declivities." The weather for most of the year is "serene and delightful."

Of the country between the Cascade Mountains and the Pacific, a gentleman, Mr. Hall, thus speaks after a five years residence at Puget Sound. "Having travelled through every State in the Union, I can safely aver that I have never found a place to equal that delightful country for healthfulness, beauty of scenery, and unvarying temperature." He represents the land in general as well adapted for cultivation and pasturage. Potatoes of a dry and excellent quality, onions, cabbages, turnips, carrots, parsnips, wheat and oats, all produce abundantly. "The pasturage generally is good throughout the year, and no farmer thinks of providing fodder for his stock during the winter. The winters are very mild, and snow is rarely more than an inch deep." He also states that "the timber, of which there is a great abundance, particularly cedar and fir, is of the largest and finest quality. In short the purity of the air, the luxuriant prairies, the forests of noble tall trees on every side, the never failing springs of purest water, the innumerable lakes, an almost profuse abundance of game and fish, all conspire to render it one of the most delightful countries of the world."

The soil near the sea coast is described in Irving's Astoria as inferior in character generally, compared with that of the interior, and in consequence, the vegetation of the latter is more abundant. "The face of the country is kept fresh and verdant by nightly dews and occasionally by the humid fogs in the morning, the latter not prejudicial to health."

Com. Wilkes, Gov. Simpson, and other writers concur in giving to the region in question a remarkably favorable character in respect to soil and climate. Near the coast the soil is not so productive, but in the interior where the surface is free from rock, it is of an excellent quality in most places. The latter remarks, particularly of the country lying to the north of the national boundary on the sea-coast, that the region in which is included the southern part of Vancouvers Island "is well adapted for colonization, for in addition to a tolerable soil and a moderate climate, it possesses excellent harbors and abundance of timber. It will, doubtless, become in time the most valuable section of the whole coast above California."

South of Puget Sound for sixty miles he describes the country as "watered by many streams and lakes," and composed of belts of wood and plains well adapted to tillage and pasturage. The belts of wood composed of stately cedars and pines, many rising without a branch or bend to a height of 150 feet."

The extraordinary magnitude attained by the forest trees in that part of the coast of the Pacific has been remarked by all who have visited that region. This remarkable growth does not appear to be confined altogether to the country along the coast.

Mr. Douglass, a distinguished botanist, while passing up the valley of the Columbia to Fort Colville, saw many kinds of pines, some of which, by measurement, were thirty feet in circumference, and "several which had been levelled to the ground by the storms were 145 feet long, with wood perfectly clear and strong."

Of the excellence of the climate, and general good character of the soil of this portion of the country, no more will at present be said. Both are beyond question well adapted for the successful development of both vegetable and animal life.

MINERALS.

Of the mineral resources of the country through, or near which, the proposed northern railroad route to the Pacific passes, enough is known from such partial and imperfect explorations as have been made to make it certain that they are quite valuable and extensive.

The route after leaving Illinois passes along the eastern and north-eastern margin of the great lead district of south-western Wisconsin, with which a connection is in progress by means of the southern Wisconsin Railroad from Janesville, a district which now sends annually to market forty to fifty millions of pounds of metal.

On the Upper Mississippi it passes near to the western extremity of the great copper region of Lake Superior, with which it will be a convenient mode of communication, by branches leading northwardly up the vallies of the tributaries of the Mississippi, which have their sources in the region in question. From discoveries recently made it is probable that silver will also become one of the valuable productions of this region, and it is now known that in middle and northern Wisconsin there are ores of iron in various localities, some of which are now worked, producing metal of an excellent quality.

Farther on, in north-western Minnesota, extending into Canada, salt lakes and springs are known to abound. These lie to the west of what is called Devil's Lake on the map, the waters of which are slightly brackish. This salt region lies a little to the north of the line of the proposed Road, and covers a space not less probably than 5,000 square miles within the limits of the United States, and judging from the account of Gov. Simpson covers even more space north of the national boundary. South of this line within our own borders there are places where the mineral is said to be found in great purity. From the remarks which follow it will be seen that there is probably in close proximity to this region, a supply of bituminous coal.

Should this opinion prove correct, salt will in time be manufactured here, in great amount, and become an important article of commerce. From this source, owing to the probable cheapness of its manufacture and facilities of communication, most of the population of the Mississippi and Missouri valleys, as far down as the mouth of the latter, and of the Upper St. Lawrence valley, as far as Lake Erie, will most probably in time receive their supply of salt. The district which embraces the salt lakes and springs is elevated about 2,000 feet above the level of the sea, and the atmosphere is in general very pure and dry; circumstances favorable to the cheap manufacture of salt whether produced by evaporation in the open air, or by the artificial means in use at most of the salt works in the country.

Within the limits of Minnesota to the south of the proposed route, are the famed red pipe stone quarries, which promise to be of considerable value in the arts. The locality of this stone nearest to the route is in Wisconsin at the head of a branch of Chippewa river which joins the Mississippi near the lower end of Lake Pepin.

Between Fort Clark or Fort Mandan and the Falls of the Missouri, mineral coal of the bituminous character has been observed in various places where it appears in the banks of the Missouri river. Lewis and Clark testify to this and their evidence is confirmed by Culbertson. Wyeth informs us that the banks of the Yellow Stone below the Bighorn, "are in many places precipitous with strata of bituminous coal," and Capt. Bonneville mentions a mountain on the Powder river branch of the Yellow Stone as "abounding in *anthracite* (?) coal." The existence of coal near the surface, and directly on the proposed route, *extending through ten degrees of longitude* is a consideration of great importance.

This immense coal field in all probability underlies the entire plain which stretches northwardly from the Missouri to the Saskatshawan and Assiniboin rivers, including the region occupied by the salt lakes and springs above described.

Gov. Simpson speaks of coal as appearing in the banks of the Saskatshawan river at Fort Edmondton, a point very near the eastern base of the Rocky Mountains.

Father De Smet saw coal on the banks of Red Deer River. He also saw "fountains which produce sulphur," and saltpetre he states "is found in abundance, and iron is not scarce in many parts of the mountains."

Lewis and Clark observed limestone at several points in the valley of the Upper Missouri. It extends in places far into the Passes of the mountains. They observed it on the upper part of Jefferson river. They also saw sandstone, on the Missouri, and granite was met with in the mountains. Materials of this character appear therefore to be abundant for construction, and being situated near the river, which is navigable for so many hundreds of miles, can be transported along the valley at no very great cost.

The existence of limestone in large quantities, and spread over a great extent of surface, is evidence of the probability that localities may hereafter be found, producing marble of a quality suited to various purposes in the arts.

Robt. Stewart, who passed in 1812 from the Tetons easterly along the mountains which separate the waters of the Upper Missouri from those of the Columbia aud Colorado, describes a species of clay found in the mountains, "from which the Indians make pots, jars, &c. It is very fine and light, of a brown color spotted with yellow; vessels manufactured of it are said to impart a pleasant smell and flavor to any liquids." He states that "these mountains abound also in mineral earths or chalks of various colors, especially two kinds of ochre, one a pale the other a bright red, like vermilion, much used by the Indians in painting their bodies."

Of the region embraced between the Falls of the Missouri and the western slope of the Cascade Mountains, but little is as yet known as to its mineralogical character.

That it does contain minerals of value is to be infered from information derived from various sources, and from the change in the geological formation of the country already alluded to as taking place at the 48th parallel of latitude.

Thornton informs us on the authority of Dr. Whitman, the Missionary who was murdered by the Indians at Wallawalla; that the latter "frequently brought copper from a place north of his station," and that judging from the information which he obtained "its locality was somewhere south of the 49th parallel." He also states that "Mr. Ricard, the late Attorney General of the Hawaiian Islands, brought to Oregon a specimen of platina obtained from a Flathead Indian, which metal the savage affirmed was very abundant at one locality in the country of his nation, but he refused to indicate more particularly."

A Mr. Lattee who was, during many years, in the service of the Hudson's Bay Company, informed Mr. Thornton that "the Indians often brought platina and silver ore to the trading post from the northern extremity of Queen Charlotte's sound" in lat. 54° N., which seems to confirm the truth of the previous statement of the existence of those metals in the vicinity of the latitude of 49. Father De Smet saw "large pieces of coal along the Kootanie river, and was convinced that it could be abundantly procured." He found also "great quantities of lead on the surface of the earth," and from its appearance he believed that "it contained a mixture of silver."

Sir John Richardson, in speaking of the probable mineral resources of the region embraced in the British possessions to the north of the latitude of 49° states, that "it would be true economy for the imperial government, or the Hudson's Bay Company, who are the virtual sovereigns of the territory, to ascertain without delay the mineral treasures which it contains. I have little doubt," he says, "of many of the accessible districts abounding in metallic wealth of far greater value than all the returns which the fur trade can ever yield."

Mr. Dunn states that near the Pacific towards the latitude of 54° N. "great quantities of virgin copper are found, some of it is worked by the natives into a kind of shield about two feet and a half long, and one foot broad."

West of the Cascade Mountains bituminous coal is now known to exist in large quantities in the vicinity of the waters of the straits of De Fuca. According to Thornton an "inexhaustible supply of a good quality may be had upon Vancouver's Island. It lies near the surface, is gotten out with crow bars and is near to a good anchorage." Dunn describes it to be of an "excellent quality, running in extensive fields, and even in clumpy mounds, and most easily worked all along that part of the country."

Coal has since been discovered in the vicinity of Puget Sound, and to the east of Admiralty Inlet, and a company has been formed for mining it within the territory of Washington.

The "Oregonian" represents it as abounding in a range of hills, and that it appears in several places in the banks of the Inlets, "within a few yards of deep water, making the shipping of it quite easy."

This appears to be the southern limit, or very near it, of the bituminous coal on the coast within our own territories, none having as yet been discovered south of that point. Of its value in view of the immense steam marine which in a few years will be traversing the waters of the Pacific from the straits of De Fuca, an adequate idea can now scarcely be formed. Its existence there to the extent now indicated will be of greater importance to the future prosperity of the territory in which it is situated, than mines of gold and silver; and if to this be added the wonderful resources of the country in its forests of timber, and general character of the soil, it gives to the territory of Washington the means of creating and maintaining a commercial and military marine, not possessed by any other section of equal extent within our own limits on the coast of the Pacific.

OBSTRUCTIONS FROM SNOWS.

Objections have so frequently been raised to a route for a Railroad to the Pacific, lying so far to the north as the one proposed, in consequence of apprehended greater obstructions from snows in winter, as to make it proper to devote some space to the subject.

In passing from the equatorial to the polar regions the rain and snow which falls annually is found to decrease in quantity, and a similar result follows in respect to places in the same latitude, in passing from the seacoast to the interior. The density or rarity also of the atmosphere and its temperature have both much to do with its capacity for retaining moisture.

In ascending from the level of the ocean, a reduction of temperature usually accompanies the decrease in density, and both are unfavorable to the retention of moisture, and hence, where there is a very wide extent of elevated country, the rains are often precipitated soon after entering the elevated region, and the winds pass on over the remaining portion of the surface, incapable of contributing the rains which are needful for vegetation.

These causes conspire to produce a great diminution in the fall of rain and snow in the interior of continents, compared with the quantity which falls in the regions near the sea coast, or in the vicinity of the larger lakes.

In very wide continents, this diminution is so great as to give to the interior often the character of a Desert.

Under the equator the annual fall of rain amounts to an uniform depth on the surface, as computed by Humboldt, for the mean of both continents of 96 inches.

In lat. 19°	80 inches.
" " 45°	29 '
" " 69°	17 "

The above is the estimated average for the latitudes named, varying of course in particular places from local causes and includes both rain and snow.

The portion of the proposed route extending from the Haut Terres of the Mississippi to the Pacific, being the part which will probably be considered the most exposed to be obstructed by snows in winter, is situated in latitude 48° N. nearly, where the average annual fall of rain and snow by the above would be about thirty inches, adding four inches for the greater amount which falls on the continent of America compared with Europe, as ascertained by numerous observations; a quantity which if uninfluenced by other considerations than that of the latitude would give about six inches in depth derived from the snow alone, that being the proportion as ascertained by observations in the latitude of Vermont. It has also been ascertained that about twelve inches of newly fallen dry snow gives about one inch in depth of water. This makes about six feet of snow for the entire fall through the winter; a quantity which if not dissipated by the occasional thaws and rains will give, when compacted by lying a long time on the surface, a depth of not more than two or three feet.

The actual fall of rain and snow throughout the region, is not correctly known from observation and can only be obtained approximately from such evidence as is within reach.

At Fort Brady, Sault Ste. Marie, outlet of Lake Superior, lat. 46½° N., the mean for six years, of rain and snow is 29.58 inches. At Prairie du Chien, on the Mississippi, lat. 43° N., it is 30 inches. At the mouth of the St. Peter's it is a little less than this, while at Green Bay on Lake Michigan, it is 35 inches, owing to its position on the lake.

Observations made in Minnesota, show that the prevailing winds in winter, are from the north and west, occasionally from the south, but very rarely from the east. This is doubtless true of the country west to the mountains.

The northerly winds at that season bring no moisture, the entire surface to, and including the Arctic sea, being fast bound in ice.

Those from the west and south-west, which are frequent in winter west of the mountains, bring with them from the Pacific a large amount of moisture, but meeting near the coast the snow-capped summits of the Cascade Mountains, the moisture is condensed rapidly, and falls the most of it in rain on their western slopes. Hence the winter in Oregon and Washington, as in California, is the rainy season, in which but very little snow falls in the region adjoining the coast, even as far north as the latitude of 50°.

Whatever moisture is not condensed in passing the Cascade Range is probably mostly precipitated on the higher points of the Kooskootskie or Salmon river mountains, so that to the east of them in the vicinity of the Rocky Mountains, on the route of the proposed Railroad, and especially upon the plains of the Upper Missouri, it is fair to conclude that but little snow or rain falls in winter which can properly be considered as the result of the evaporation on the Pacific.

When the winds are southerly, as they are at times in the winter in the region in question, as elsewhere, the humidity with which they may be charged, if not condensed on the high plains of the Great Basin, the Colorado, the Del Norte, and Upper Arkansas, within the of limits which are many mountain ranges of great elevation, are very completely deprived of their moisture, by the cordon of mountains stretching from the Cascade range of Southern Oregon to the Great Bend of the Missouri, including the Blue mountains, the Green river mountains, the high summits of the Wind river chain and the Black mountains. North of these, upon the route of the proposed Railroad, the quantity of snow or rain deposited in winter by the southerly winds must be very limited.

Farther to the east, in the vicinity of the great lakes which are never completely frozen over, about the Haut Terres of the Mississippi, in northern and eastern Wisconsin, both snow and rain would reasonably be expected to fall in larger quantities in winter than in places farther west, and this appears to be the case from the information obtained.

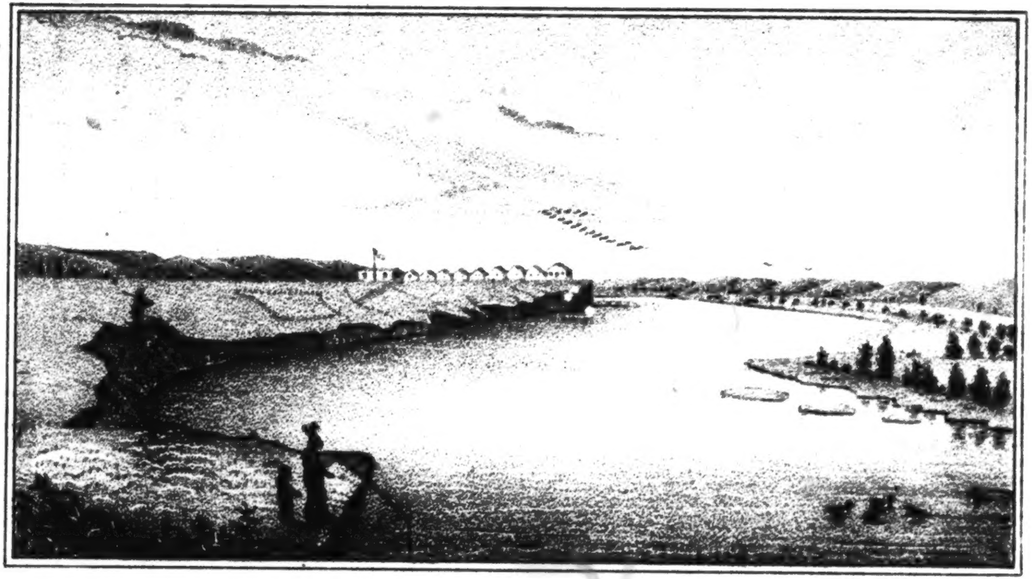
Such is the theory of the snows and rains in winter, throughout the entire region in question, from the Lakes to the Pacific, based upon the natural laws which govern the distribution of moisture over the earth's surface. In regard to the facts, it is known that in Northern Illinois but very little snow falls in winter.

In Wisconsin for the entire portion south of Green Bay, the snow seldom exceeds a foot in depth, and more than eight inches will not be found on the average at any one time. In the vicinity of Lake Michigan, it sometimes has a greater depth, but is seldom so deep as to render it necessary to resort to the usual means employed at the east for removing it from the Railroads.

In the higher and wooded portion of northern Wisconsin, snow sometimes accumulates to a depth of three feet and upwards. In the upper peninsula of Michigan it attains at times a greater depth.

In Minnesota, about the sources of the Mississippi, its depth is somewhat less than in northern Wisconsin.

Seymour in his "Sketches of Minnesota," states that the snow in the pineries of the Mississippi the previous winter, (1849–50) was from "one to two feet deep, and free from crust. In milder winters a crust is sometimes formed." He also states that Dr. Williamson who has resided in that country fifteen years at the Winnebago Agency, above the latitude of 46° N. informed him that "the snow was deeper the last year than any winter since he had resided there. It was however, only 2½ feet deep." This is very much less than near the Atlantic coast in the same latitude. In the valley of the Mohawk, N. Y. in a more southern latitude and at a much lower elevation it has been known to be twice that depth. At Burlington, Vt., two degrees fartner south and 346 ft. only above the sea, the average fall of snow for ten years past



MANDAN VILLAGE, UPPER MISSOURI.
From Catlins N. American Indians.

according to Prof. Thompson has been 85 inches, the maximum 123 and the minimum 48 inches.

In the narrow mountain passes of Vermont and New Hampshire, which are now penetrated by railroads on which the trains run uninterruptedly at all seasons, the snow falls in greater amount and accumulates to a greater depth than at Burlington.

The Upper Mississippi, unlike the rivers which have their sources on either side of the Alleghanies, has no winter or spring floods, none which can be attributed mainly to the melting of snows which have accumulated on the high grounds from whence it originates.

The river rises slowly under the influence of late spring rains, attaining its greatest elevation in June, which at Dubuque is fifteen to eighteen feet, and falls in the same gradual manner, causing comparatively but little injury to property.

In respect to the country west of the Coteau du Missouri in the Missouri valley, we have the evidence of Lewis and Clark and others, that the snow does not fall in any great quantity or attain any great depth in winter. In the journal of the former, and of Sergeant Gass, of their winter sojourn at Fort Mandan, they state that slight falls of snow were noticed on the 14th, 15th and 24th of November, amounting, altogether, to four or five inches only. On the 27th and 28th of November it fell to the depth of thirteen inches, and did not fall again until the 2d January. On the 8th and 10th of Dec., "the Buffalo darkened the prairies in great numbers." They killed several, and "found the snow six to eight inches deep, and sometimes eighteen inches."

On the 3d and 14th of January were slight falls of snow and on the 14th February, the last during the winter. On the 13th February Capt. Clark returned from a Buffalo hunt and he remarks, that on the last day he "walked 30 miles on the ice and through snow in *many places knee deep.*" On the 6th of March the snow was evidently all gone, as the Indians were burning the prairies to get an early crop of grass. No mention is made of the use of snow-shoes during the winter by themselves or by the natives, or of their having been used in former winters.

The fact that the buffalo and the elk were able to subsist on the prairies through the winter, shows that the snow could not have been very deep. The rains through the winter, were less frequent than the snows. In noticing a fall of rain on the first of April, they state that "with the exception of a few drops at two or three different times, (January 1st and February 2d,) this is the first rain since the 15th of October last," and they remark in another place that "the air is remarkably dry and pure in this open country, very little rain or snow either winter or summer."

Catlin states that "the horses which the Indians ride in this country, (the Mandan villages,) are invariably the wild horses which are found in great numbers on the prairies, and have, unquestionably, strayed from the Mexican borders, into which they were introduced by the Spanish invaders of that country, and now range and subsist themselves in winter and summer over the vast plains of prairie that stretch from the Mexican frontier to lake Winnipeg, on the north, a distance of 3000 miles." Writing from the mouth of the Teton river, on the Missouri, he says that, "it is very evident that as high north as lake Winnipeg, seven or eight hundred miles north of this, the buffalo subsists itself through the severest winters," and also that "the snow in these regions often lies to the depth of three or four feet, being blown away from the tops and sides of the hills in many places, which are left bare for the buffalo to graze upon."

In the journal of Mr. Hunt, in Irving's Astoria, it is stated that the Shayen Indians at the head of the Shayen branch of the Missouri, catch horses on the prairies and "repair to the Arikara villages, where they exchange them for corn, beans, pumpkins, etc." These villages are on the Missouri river in latitude 46° to 47° N. a short distance below the Mandans.

At the mouth of the Yellow Stone, from information derived from a gentleman connected with the American Fur Company, it appears that the snows seldom accumulate to a depth as great as three feet. The average or ordinary depth in that part of the Missouri valley is 18 to 24 inches only. This also appears to be about the average depth throughout the remaining portion of the valley to the mountains.

The Missouri, like the Mississippi, is not swollen by winter or early spring floods. At the period of the breaking up of the ice at Fort Mandan in March, the river, according to Lewis and Clark, rose but a few inches. The winter and early spring rains are not sufficiently copious, combined with the melting of the snows, which cannot be very deep in the lower valleys, to produce floods at that season.

At a later period, the rains, joined to the influence of a summer temperature upon the snows collected in the higher parts of the mountains, cause the river to rise very gradually, attaining its greatest height in July, when it soon after subsides in the same gradual manner.

Such of the tributaries of the Missouri and of Clark's river as are situated in the vicinity of Lewis' Pass are never much swollen at any season. According to Lewis and Clark the banks of Medicine river near the Missouri, which do not exceed 3 to 5 feet in height, are never overflowed. The Cokalahishkit, although its banks are not high, is never overflowed. This could not be the case if there was any great accumulation of snow in the valleys of these streams in winter. Even the Missouri river at a point 100 miles nearer to the snow-capped summits of the Fremont group, with banks of only eight feet high, is never overflowed, and Capt. Clark says of the Yellow Stone, which has its sources still nearer to the snow-crowned summits of the Wind river and Black Mountains, that "its banks, although low, are never subject to be overflowed, except in the vicinity of the mountains."

Lewis and Clark when passing the Kooskootskie Mountains found the snow in the last days of June from two to eight feet deep, on the average, for sixty miles. One week afterwards they were on the summit of Lewis' Pass, between Clark's river and the Missouri, where every vestige of snow had disappeared, and vegetation was in an advanced state; an evidence both of the less amount of snow upon that summit, and of its lower elevation.

The obstruction offered by snows to the movement of trains on a railroad depends upon their depth, suddenness of their fall, and accumulation by drifting, and also by the width of the passage or valley through the mountains occupied by the road. It will be seen by the description already given of Lewis' Pass, that the valley is an open one, and is not enclosed between very high mountains, and consequently the land will not be exposed to slides or avalanches from adjoining slopes. Wherever accumulations of snow may chance to occur from drifts, ample space exists for its displacement by the usual and thoroughly effective means resorted to in similar cases on all railroads; means which, upon a road doing a large business, are always at command, and being constantly applied, will make it impossible for the snows to accumulate in so large a quantity upon the track, in the region in question, as to form a very serious obstacle to the movement of trains.

Throughout the entire distance from the lakes to the Rocky Mountains, it is quite certain that the quantity of snow is very limited, and that it falls mostly in November and the first part of December. After that period there is very little humidity in the air or evaporation to produce it from local causes, and the temperature is then too low for it to reach that region from any very remote source. The winters are in general characterized by a fine bracing atmosphere, great uniformity in the weather, more so than is experienced near the coast, the cold occasionally intense, but on the whole quite as agreeable and probably more favorable to health than the winters of New England.

Upon that portion of the proposed route lying between the Rocky and Cascade range of mountains the snow falls to a greater depth than upon the portion last under consideration. Com. Wilkes informs us that in the Columbia valley north of the latitude of 49°, a region covered mostly by dense forests, "the snow lies on the ground from November to April or May on an average six feet deep."

At the missionary station at Lapwai, on the Kooskootskie river 150 miles south, and elevated 1,600 feet above the level of the sea, there is usually but little snow and the "grass continues green the year round." The mean annual temperature at this point is 53° F. At Walla Walla situated to the west of Lapwai and elevated 1,300 feet above the sea, scarcely any snow falls the entire winter. On the plains of the Columbia 100 miles further north "the snow never covers the earth more than a foot deep."

Capt. Bonneville informs us that he left the Green River valley of the Colorado for the upper part of the Salmon river valley, for the reason that the winters in the former were represented as more severe, the snow frequently falling to the depth of several feet. He remained, however, in the latter place no longer than the last of December, being obliged to remove to the valley of Lewis river. The snow, while he remained, was not so deep as to prevent his horses from getting access to the grass, and during that period and for the remainder of the winter the incursions of the Blackfeet Indians, whose territory is east of the Rocky Mountains, were frequent, showing that the Passes through the mountains at that season were not only passable, but afforded sustenance for the horses of the Indians, the number of which were increased on their return by captures from their enemies.

Capt. Bonneville, in his march to Lewis river, found the snow on the great lava plain, which forms a striking feature in the character of its valley, only twenty inches in depth. His encampment on the river was probably in latitude 43¼° N. between Fort Hall and Henry's Fork, at an elevation of about 4,700 feet, Fort Hall, being 4,500 feet by Fremont's measurement. Towards the last of February he returned to the Salmon river. The snow upon the plains was then 30 inches only in depth. Upon these plains and in the mountain defiles leading from them, the buffalo remain throughout the winter. In one of these defiles Capt. B. found the "weather moderate" and "the grass sprouting more than an inch in height."

Father De Smet who ascended Clark's river in a *canoe* from below Kalispel Lake to the mission of St. Mary's, a distance of 250 miles, in the beginning of February 1845, states the depth of the snow in the valley to be five feet. The mean elevation of the valley is probably about 2,000 feet From the preceding it is infered that three feet is a liberal estimate, for the mean depth of the snow when lying deepest upon the portion of the proposed route between the Rocky and Cascade Mountains.

In Irving's Astoria it is stated that "but little snow falls throughout the winter in the plains and valleys of the lower part of the Columbia, and that it rarely lies on the ground more than two days at a time."

The remaining portion of the route to the Pacific, lying west of the Cascade or President's Range, it is well known is not subject to falls of snow of any great depth. It is upon that part only which is situated in the more elevated portion of the mountains that the road will be liable to obstructions from this canse. Lieut. Johnson passed this Range the last of May in a lat. 47¼ N. and found snow on the summit at the height of about 5,000 feet. The summit was five miles across, and the snow extended down from it on the east side, making the distance covered by the snow in all, eight miles, and the greatest depth, ten feet. This snow being below the line of perpetual congelation was all accumulated the winter previous, and had probably wasted considerably, so that the depth was undoubtedly much greater, and it extended much farther down the sides of the mountain.

Whatever the actual depth or extent of the snow may have been, as an obstacle to the running of trains on a Railroad, it should not be considered very formidable. At a lower elevation such as there is much reason to expect can be obtained for the passage of the road, not exceeding, it is supposed, 4,000 feet above the sea, there would not, it is believed, have been any snow visible at the period of Lieut. Johnson's visit, unless in some very deep and narrow ravines where the sun's rays could not penetrate. The distance across the highest part of this Range is short comparatively, so that in the event of its being deemed advisable to adopt a plan of construction for a Road more than ordinarily expensive to obviate any liability to obstructions from snows, it will not enhance very materially the cost of the work.

The apprehension that any extraordinary expense will need to be incurred to prevent obstructions from snows on the Cascade Range, may prove entirely groundless when the Road comes to be located and constructed.

It is by no means certain that a Pass, even lower than that assumed, may not be found, or that the mountains may not be in great part avoided, and the gradients lessened, without very materially increasing the length of the Road, or carrying it into the territory of a foreign power.

It is known that a complete opening through the Cascade Range exists near the international boundary, where it is passed by Frazer's river, and it is known also, that Frazer's river at that point is very near to the boundary, and may possibly be so near as to permit the location of the road within the limits of the United States, and thus avoid the additional rise and fall, and higher gradients, and inconveniences from snows consequent upon the passage of the mountain by a more direct route. The branch to the main line which will doubtless ultimately be carried down the valley of the Columbia to the mouth of that river, will avoid entirely, all the difficulties of the Cascade Range, whether proceeding from the snows or from any other cause.

When the New York and Erie Railroad was projected, fears were entertained by many, that if built, it might be rendered useless for a portion at least of every winter, because of the snows which fall and accumulate often to a great depth in the elevated country through which it passes. In a Report in relation to that Road in 1838, I remarked "that the snow in the latitude of New York does not fall on the average more than about 20 or 25 days in the year, and upon a road doing a constant business with locomotive steam power, cannot as an obstruction exceed the ordinary interruptions to the transportation upon canals from breaches in the banks, repairs and floods and other failures during the season of navigation."

This opinion has been fully confirmed by the subsequent experience on that road, and upon other roads in the northern and eastern States where the snows constitute a more serious obstacle to the regular running of trains in winter, than anything of a similar nature to be met with on the entire line of the proposed railroad of nineteen hundred miles from Lake Michigan to the Pacific Ocean, with the single exception, perhaps, of the few miles embraced in the passage of the Cascade Mountains already noticed.

It may be remarked in concluding this branch of the subject, that whatever may be the difficulties from snows on the proposed Northern route, it is quite certain they will not only be equalled, but will probably be surpassed by those which will be experienced on any route which can be found between it and the 35th parallel of latitude, terminating not farther south on the Pacific than San Francisco.

This follows from the greater humidity of the atmosphere due to the lower latitudes, and from the great elevation of the Sierra Nevada and Rocky Mountains. It was, it will be remembered, not very far from Santa Fe that Col. Fremont lost one-third of his party and all of his animals in the snows of the Sierra San Juan; and although the elevation he attained was considerably greater probably, than that of the Pass which he intended to take, still it is evident that in the upper Del Norte mountains the snows must at times fall to a depth sufficient to be an impediment of a serious nature to a railroad.

Even upon the high plains of the Arkansas snow storms have been known to prevail with such suddenness as nearly to overwhelm men and animals when unable to find shelter from their violence. What is true of the mountains and plains of the Upper Del Norte in this respect, is also true in a greater degree of the Nevada mountains in California, as may be seen by Col. Fremont's description of his passage across them in the winter of 1843–4, and also by reference to the journal of McKinstry who was one of a party of emigrants, numbering eighty in all, nearly one-half of whom perished in the snows in their attempt to cross the mountains in the fall and winter of 1846 and 1847.

For the reasons above stated, it is probable that the obstructions which will be experienced from snows on any of the other proposed routes north of the latitude of 35° will be much greater than upon the one under consideration, while upon the latter they will not be of so formidable a character as not to be readily surmounted by a resort to the proper means, without involving any very great or unusual expense for the purpose, provided the road is judiciously located and constructed.

TERMINI ON THE PACIFIC AND ON THE LAKES.

Having now concluded the description of the proposed road, its character, and the country through which it passes; attention is requested to the places selected for its termini.

In no part of the world can a site be found for a great maratime city,—such an one as must necessarily grow up at the terminus of the proposed railroad on the Pacific,—superior to that which is afforded on the waters connected with the straits of De Fuca.

According to Commander Wilkes these straits are ninety-five miles in length, and eleven miles broad. They connect within our own borders with several spacious inlets, known as Hood's Canal, Puget Sound, Admiralty Inlet, and the Archipelago of Arro. These were all carefully surveyed under his direction, and he represents them as "unsurpassed by any estuary in the world. They comprise very many fine harbors and safe anchorages, and are entirely free from dangers. * * The country by which these waters are surrounded is remarkably salubrious, and offers every advantage for the accommodation of a vast commercial and military marine, with conveniences for docks; and many sites for towns and cities,—at all times well supplied with water, and capable of being provided with every thing by the surrounding country, which is well adapted for agriculture." In particular, he states, that "on the east side of Admiralty Inlet, north of the latitude of 47°, are many fine harbors and bays, all of which, in time, will become places of resort for vessels. Situated on the east side they are more accessible for trade than those on the west side, and from having a large area of country around them, susceptible of improvement, they must become more thickly and densely populated." Ten of these bays and harbors are enumerated. "Nothing," he continues, "can exceed the beauty of these waters, and their safety." "Spring tides rise eighteen feet, and neap tides twelve feet, affording every facility for the construction of dry docks; winters mild and of short duration, and harbors never obstructed by ice." The islands in the Archipelago of Arro, he informs us, contain quarries of sandstone and granite, convenient of access and suitable for building.

Thornton in speaking of these waters, states that there are many reasons which produce the conviction on his mind that they "will ultimately send out upon the ocean, not only a greater number of able nnd skilful seamen than the Bay of San Francisco, but more than any other of equal extent in the world."

"Among the reasons which may be assigned for this opinion, is the inexhaustible supply of good timber along the shores of this great Bay, and the unlimited amount of motive power, as compared with the almost, if not quite total absence of both, about the Bay of San Francisco. I may also mention the fact," he says, "of the vastly superior productive powers of Oregon, (now Oregon and Washington,) as an agricultural country, rendering it capable of furnishing supplies to an indefinite extent to a commercial and military marine."

To the above may be added, the abundant supply of bituminous coal for marine and manufacturing and other purposes, since ascertained to exist in the vicinity of those waters, and to which allusion has already been made in another place.

Naval gentlemen with whom I have conversed, and who have visited these waters, all concur in giving to them the high character awarded to them by Commander Wilkes and Mr. Thornton. They are capacious enough to accommodate the navy of the world; are free from shoals and from all dangers not visible, and are easily accessible at all seasons. As a site for a great commercial mart they have no equal in the particulars enumerated above, on the Pacific, within the limits of the United States.

The only other ports on that coast, which can be considered as having claim to consideration as points of general resort for the marine of the Pacific, have already been named. They are the mouth of the Columbia, San Francisco, and San Diego.

The mouth of the Columbia was for a long time deemed to be difficult of access. The dangers and difficulties of the entrance are spoken of by Wilkes and Farnham and others, but the recent surveys made under the direction of Prof. Bache, by Lieut. Bartlett, of the Navy, have disclosed the existence of a channel not before known, and the entrance is now effected at the proper period of the tide with so little danger, that the Insurance offices, it is understood, take risks for the Columbia, the same as for San Francisco. In 1850 the pilots, according to Lieut. Bartlett, took one hundred and forty sail, through the new, or South channel, some of them drawing seventeen and a half feet, and ten vessels passed through without a pilot, no accident occurring. In this time, only four vessels passed through the old or north channel. The greatest depth on the bar is 21 feet.

The spring tides within the mouth of the Columbia, at Astoria, rise seven and a half feet, the neap tides five and one-third feet, and the mean rise and fall is estimated at six and one-third feet. In the facilities afforded for the erection of dry docks, the mouth of the Columbia is inferior to the waters connected with the straits of De Fuca, the mean rise and fall of tide in the latter being about fifteen feet. In respect to the tides and character of the entrance, the mouth of the Columbia does not appear to differ very much from the harbor of New York, and is consequently very well suited for the terminus of the proposed railroad.

By making it such, the line of the road will be increased in length about one hundred and fifty miles, if the point of divergence is placed at the entrance to Clark's River Valley east of Fort Colville. The Cascade Mountains, which constitute the only obstacle of a serious character on the Northern route, throughout its entire length, will be entirely avoided, and hence should it be found, from the surveys now in progress, that those mountains cannot easily be passed on the shorter route to the Straits of De Fuca, it will follow that the mouth of the Columbia will be the best principal terminus for the proposed road; and whether it is so found or not, its character as a maratime port, and its relation to the valley of the Columbia is such, as to render a connection with it indispensable. In relation to the Asiatic trade its position is about as favorable as the proposed terminus at De Fuca, in consequence of the latter being placed so far inland; a principal objection to it, being the increased distance by railroad from the Pacific to the Lakes.

In respect to the Bay of San Francisco, we are informed by Commander Wilkes, that it is "well adapted for a naval depot or a place for whalers to recruit and refit;" but he "knows of no place where a natural site for a town can be found throughout the whole Bay," and it appeared to him "extremely difficult to select one where the locality would permit of extensive artificial improvements."

The city of San Francisco is situated a short distance within the entrance to the Bay on the south side. The population of California, exclusive of what is embraced within the limits of the city, is mostly found north of the Bay of San Francisco, in the valley of the Sacramento and its tributaries, a region so situated as to render it difficult if not impossible to form a very direct Railroad communication between it and the city of San Francisco, a disadvantage not experienced by the other places named in respect to railway connections with the interior.

In regard to its position in relation to the Asiatic trade, in the facilities it possesses for obtaining supplies of timber, fuel and provisions, and in its probable future position as a central point in relation to the population which is rapidly increasing on the shores of the Pacific, San Francisco is believed to be much less favored than its northern rivals at the mouth of the Columbia or at the Straits of De Fuca.

In respect to the other port mentioned, that of San Diego, Commander Wilkes describes it as an "arm of the sea ten miles long and four miles wide, and being land-locked is perfectly secure from all winds. The entrance is narrow and is easily defended, and has a sufficient depth of water, twenty feet, at lowest tide." There is a bank of kelp, three miles long by one-fourth broad, at the entrance of the harbor, which must be avoided by large vessels. "The drawbacks," he states, "are want of fresh water, the streams not reaching the bay in the dry season," and the character of the surrounding country, which is "a barren waste of sand hills, composed of volcanic sand and mud mixed with scoria. The land is unfit for cultivation. This leaves little to recommend it but the uniform climate, good anchorage and security from winds."

In another place he speaks of its inadequacy to accommodate the commerce of the Pacific, and of the country around it to furnish the necessary supplies.

The superintendent of the Coast survey considers the harbor of San Diego, from the shelter it affords from all winds and the depth of its water, as second only to San Francisco. He says, however, that "the most important subject connected with the Bay is the effect of the debouchement of the San Diego river, bringing with it, when high, (in the rainy season) great quantities of sand directly into the channel."

The impression seems to be that the harbor will be ruined, unless the course of the river is changed, which is said to be practicable.

The mean rise and fall of the tide of this port is 6 feet, spring tides 9 feet, and neap tides 3½ feet. At San Francisco, as stated, the mean rise and fall of the tide is 6 feet; both inferior in this respect to the waters connected with the straits of De Fuca. The harbor of San Diego being in lat. 32° 40′ N. near the Mexican boundary, is too far south to be the terminus of any line of Railroad from the east which does not cross the lower part of the valley of the Colorado, and hence does not properly come under consideration from any relation which it has to the proposed Northern route.

Humboldt harbor, between San Francisco and the mouth of the Columbia, in lat. 40° 45′ N. is more capacious than San Diego, but the fact that it is not accessible in very heavy weather, and cannot be approached by any important line of Railway connecting directly with the interior, is sufficient to exclude it from the list of places suited for the main terminus of the Pacific Railroad.

The point on the eastern coast of Asia, already described, as the most desirable to be reached of any single point, is Shanghai, in China. This point is also designated as being the most central to the trade and commerce of Eastern Asia in a late report of Hon. E. C. Cabell, M. C. This being its character, its actual distance from the principal points on our Pacific coast, becomes an enquiry of importance. By computation, the length of the arc of a great circle of the earth, connecting it with San Francisco is 6,185 miles, and it is distant from the terminus of the proposed Road at the Straits of De Fuca, computed in a similar manner, 5,716 miles, making a difference in favor of the latter of four hundred and sixty-nine miles.

Jeddo, the capital of Japan, is about one thousand miles nearer to either port than Shanghai. In making the round trip to Shanghai or Jeddo, or to any port in China or Japan, vessels from San Francisco, must traverse nearly one thousand miles farther than from the Straits of De Fuca; an increase which it is certainly very desirable to avoid in view of the vast commerce which will ultimately be carried on between the two continents.

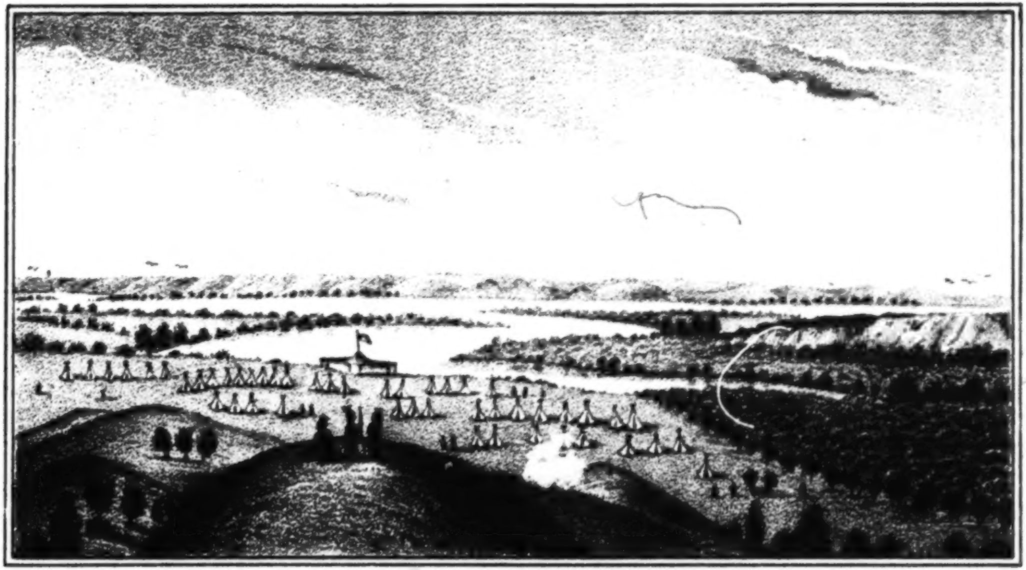
While considering the Straits of De Fuca or the mouth of the Columbia as points the most proper for the main terminus of the Road on the Pacific, its benefits can be extended to other points of importance; to Humboldt harbor for instance, and to the Bay of San Francisco. Affording to each of these places a means of communicating with the leading cities on the Atlantic, and in the Mississippi and St. Lawrence valleys, superior probably, as will be shown hereafter, to any other which can be devised.

That San Francisco will continue to be a point of very great commercial importance to a large extent of country is not doubted, but it cannot claim the preëminence as a great commercial mart, and although it has thus far advanced rapidly in population, it must eventually yield the palm in that respect to the mouth of the Columbia or the Straits of De Fuca. Its distance from the latter point, in a direct line is 733 miles and by water probably 850 miles. From the mouth of the Columbia it is distant, 580 miles direct, and by water probably 600 miles.

The terminus at De Fuca of the proposed Road, not only offers a shorter communication with Eastern Asia than any other point on the Pacific within our own borders, but its position is such as to render a direct communication with it by Railway from the Atlantic more important than with any of the more southern ports in California, for the reason, that the latter having a more southern latitude are more favorably situated in respect to the existing and proposed lines of communication between the Gulf of Mexico and Carribean Sea on one side, and the Pacific on the other.

Of these lines, two only which traverse the Isthmus are in operation, one of them crossing at Panama and the other by Lake Nicaragua. Three others are projected which also cross the Isthmus and may in time be accomplished. These are the Tehuantepec and Honduras, which are railway routes, and the interoceanic canal from the Gulf of San Miguel on the Pacific to Caledonia Bay on the Atlantic, 120 miles south of Chagres. This last work is now said to be practicable by a thorough-cut, thirty-three miles only in length, and one hundred and eighty feet in depth at the deepest point; having no lockage except what may be required to regulate the flow of the water caused by the difference in level of the two oceans.

The more southern Ports of our Pacific coast, will be benefited in a higher degree by these improvements than those at the north, thus giving to the latter a stronger claim to the location of the proposed Road across the continent; a claim which is fortunately sustained by the superior character of the Northern route for a great commercial thoroughfare. The northern position of the latter also secures it in a great degree from the injurious competition which a



MOUTH OF THE YELLOWSTONE, UPPER MISSOURI.
From Catlins N. American Indians.

more southern route must necessarily experience from the communications alluded to across the Isthmus.

If the attention is directed to the route to China from the Straits of De Fuca, or from the mouth of the Columbia, it will be seen that it passes near to the Aleutan or Fox islands; the Kurile islands and the Japan islands; the whole forming a chain extending nearly two-thirds of the entire distance to China, and affording eventually convenient places for repairs and depots for fuel, besides making, with the countries adjacent, valuable contributions to the trade of the Pacific.

The Islands first named constitute the southern bounds of the sea of Kamschatka, forming a girdle extending quite across the entrance to Behrings Straits which open into the Arctic sea. Sir John Richardson in speaking of the influence of these islands upon the navigation of the Pacific, and of the climate of western America, says, that "the course of the ocean currents and interposition of the peninsula, of Alaska and its prolongation by the Aleutan chain of islands protect the west coast of America from the masses of drift ice which in the same latitudes encumber and chill the Labrador coast for most of the year."

Wilkes in his "Western America," speaking of the navigation of the Pacific says, that, "lookimg beyond this continent we find equal advantages existing in the communication with China, and the eastern Islands, not only by steam but by sailing vessels, the winds being favorable both ways. The passage to China would be made with the assistance of the *trades* and the return voyage, by the aid of the *variables* in the higher latitudes."

"No country is so well situated to communicate with all parts of the Pacific ocean as Oregon (now Washington), and for advantages it is equal to any, whether considered under the head of agriculture, commerce or manufactures. It holds that position with regard to the Pacific and its islands, which must ever make it a ruler of its commerce, and when once a direct communication with it has been opened, from the east side of the continent, it must receive the aid both in capital and emigration to rise quickly into importance, and its weight to be felt throughout that ocean."

The points which are likely to be most prominent as termini for the proposed Railroad on the great lakes of the St. Lawrence chain of waters are, the west end of Lake Superior; and Green Bay, and the cities of Milwaukie and Chicago on Lake Michigan.

The place indicated as the most suitable for a terminus at the west end of Lake Superior, is the Inlet at the junction of the St. Louis and Nowadji Ragouche rivers. This Inlet is represented as of ample size, is secure from the winds and waves of the Lake, and accessible to vessels drawing 8½ feet water. This depth it is represented can be increased with little expense to 12 feet; which exceeds the average draught of lake vessels. The St. Louis river, for some distance above the junction, affords accommodations for vessels of a smaller size.

Lake Superior is elevated about 630 feet above the sea, its bed in the deepest part is below the sea level, and its waters have a mean temperature beneath the surface of 40° F. The navigation upon it is good for six to seven months of the year, and continues often into December.

The rich mines of copper and iron on its southern and northern borders are bringing to its shores a large population, and when the canal of the Sault St. Marie is completed, as it soon will be, the only obstruction to a free communication with the other great lakes will be removed, and the waters of Lake Superior will be furrowed by vessels from ports many hundred miles distant, to the junction of the St. Lawrence with the Atlantic.

About seventy miles to the east of St. Louis harbor is a noble and spacious bay, the entrance to which is protected by Madeline island, forming what is probably the best harbor on the lake, and from its many attractions must become a place of some importance. The extension of the proposed Road to this place, may possibly be attended with some advantage should the ice at the opening of navigation in the spring remain for an inconvenient length of time in the harbor of St. Louis river.

The other places named are on Lake Michigan. Of these, Green Bay affords the best natural harbor. Its importance as a lake port, will soon be greatly increased by the opening of a navigable communication with the waters of the Upper Mississippi.

This work which consists mainly of an improvement of the Neenah, and Wisconsin rivers has been in progress for some time under the control of the State. It has now passed into the hands of a corporation and will doubtless soon be accomplished, and if well done, will be the channel through which must pass a very large portion of the trade of Wisconsin, Northern Illinois, Iowa and Minnesota. Upon this line of communication between Lake Winnebago and Green Bay or Depere (which last is in fact the head of Lake navigation) is a fall in the outlet of the Lake extending through several miles, of 160 feet. This great power, from its position and character, being subject to but little variation in consequence of the number and magnitude of the reservoirs that supply it, must in time become very valuable, and must add greatly to the importance of Green Bay as a place of business. It will eventually become the second city on Lake Michigan, Chicago being the first.

Milwaukie is now the largest town in Wisconsin. It is beautifully situated on the shore of the Lake ninety miles north of Chicago, but is somewhat limited in its harbor accommodations. The latter may be increased by the erection of suitable works for the purpose.

So long as the region of country west of Lake Michigan was dependent solely upon the navigation of the Lakes for its means of access to the great markets, Milwaukie was well situated for business, being the most convenient port for an extensive and very fertile region of country; a region embracing the valley of Rock river in Wisconsin, which is probably not surpassed in its agricultural capabilities by any other district of equal extent in the Union.

The lines of railway which are now being constructed throughout all parts of the West will necessarily produce changes, to a certain extent, in the relative importance of towns, in that part of the country. The projected road from Milwaukie to LaCrosse and another to Madison will connect that city with the Great Pacific line in the best manner and afford an outlet to the Lake, mutually advantageous to that city and to the road. Other towns of less note on Lake Michigan, viz: Sheboygan, Racine, and Kenosha, have already taken measures that will secure to them a similar connection. The number of convenient points of connection with Lakes Superior and Michigan within the limits of Wisconsin, give to the latter an interest in the Northern route to the Pacific unsurpassed by any other State in the Union.

Chicago being near the southern extremity of Lake Michigan, is a point towards which the various lines of railway traversing the country west and north-west of the Great Lakes, must converge, and being also at the extreme limit of the unrivalled navigation of the Lakes is the point of convergence for many other lines from the west around to the south, by which the business and the travel of a vast and very fertile region of country finds its shortest and easiest connection with the navigation of that Lake. Add to this its very central position in respect to the most fertile portions of the Mississippi and St. Lawrence basins, and the generally favorable character of its climate, and it is quite certain of becoming in time the largest inland city of the Union.

Unlike most inland cities it will occupy, in a great measure, an independent position, receiving its Asiatic productions from the west, its tropical productions from the south, the produce of the fur bearing countries direct from the north, and the trade of the Atlantic from the east. Thirty years hence the population of the region of country immediately dependent on Chicago as a commercial mart, will probably be greater than that which now sustains the city of New York, and being without a rival in its immediate vicinity, and nearly central to the entire population between the Atlantic and Rocky Mountains, it is difficult to fix a limit to what will ultimately be either its actual or relative magnitude.

The present harbor accommodations of Chicago are included in the two branches of the Chicago river. One navigable four, and the other three miles from their junction, which is half a mile from the Lake. In view of its future growth, an outside harbor will, in time, be required, and when formed, should be on a liberal scale and controlled by the city, for the best good of the various interests concerned.

The character of the navigation of the great Lakes and the artificial channels connected with them, is now so well known as scarcely to require any notice in this place. The value of property transported upon them annually is said now to exceed *four hundred* millions of dollars, and is constantly and rapidly increasing. In cheapness it is not approached by any other mode of intercommunication. Three mills per ton per mile, from New York city to Chicago, for heavy goods, or $5½ to $7 per ton, is now an ordinary rate. This mode of communication with the Atlantic is available about seven months in the year. When the Erie canal is enlarged throughout its entire length, as it soon will be, and the ship canal, which is about to be constructed within our own limits, between Lake Erie and Ontario, is accomplished, this rate will be still further reduced. It will be still further reduced, also, as a consequence of the great increase in the business of the Lakes, the improved character of the vessels, and of the harbors, by which the risk and charges of insurance will be lessened.

The reduction in the cost of transportation upon the Lakes, and in the tolls upon the Erie canal, which have hitherto, from time to time, been made, has had the effect of attracting trade to the lakes from remote points, which, but for this reduction, would have sought some other route to the seaboard, and probably some other mart than New York. The future reductions which will be made, for the reasons stated above, will have the effect of widening the circle to such a degree, that by far the largest portion of the Mississippi valley will be tributary to the Lakes; and its productions, instead of seeking a southern market along the descending navigation of the Mississippi, will flow northwardly to the Lakes and thence to the great emporium on the Hudson. The influence of climate and other causes will doubtless aid materially in producing this result.

The Port upon the Lakes which will receive a larger portion of this trade than any other is Chicago. This place is not only favored with a cheap navigation to the seaboard, but it has a very direct Railroad communication with the leading cities in that direction, on which the cost of transportation by that mode of conveyance will be low, in proportion as the amount of business will probably be greater, than upon any other lines of equal extent proceeding from the interior to the seaboard.

The proposed Northern route for a Railroad to the Pacific, is not only peculiarly favored in respect to its termini on the Lakes and on the Pacific, and in its position in respect to the Asiatic trade, but it is also greatly favored in its connections with the navigable waters of the Mississippi and Columbia, and also of the Red river of the north.

At St. Pauls, the capital of Minnesota, a short distance below the Falls of St. Anthony, it connects with the Mississippi, from whence a communication already exists with all parts of that river and of its tributaries accessible by steamboats. It crosses the Red river in lat. 46¼° N., the head of navigation of that river. At the Falls of the Missouri, distant about 700 miles from the Pacific, a connection can be made with the navigable waters of the Missouri, and other similar connections may be made at convenient points throughout the entire distance of 500 miles from the Falls to the Mandan villages.

These connections will be of great importance to the population of the Missouri valley and its tributaries; for the Missouri river, notwithstanding the rapidity of its current caused by the great inclination of its channel, compared with the Mississippi and Ohio, the limited duration of the periodical rise of its waters and the peculiar character of its banks, is still susceptible of very considerable improvement for the purposes of navigation, and will always possess very great value as a channel of intercommunication. The quantity of water flowing in it is not likely to be materially lessened by the same cause which has affected many eastern rivers, namely, the removal of the forests, thus increasing the evaporation and rendering the contributions from their various tributaries less equable, and producing an irregularity in the flow unfavorable to navigation.

Although this irregularity is not so great on the Missouri as on many other rivers, the Ohio, for instance, yet how to remedy it, is a problem of more difficult solution, probably, than upon that river: for if the flow were rendered nearly uniform by a resort to reservoirs, yet, owing to the great declivity of its channel, and character of its bed and banks, it would, doubtless, be exceedingly difficult to give to the river a regime that would be permanent. Its direction and depth, even then, would be constantly changing and the attempts to correct this tendency would be attended with very considerable expense, and yet, as stated above, there is no doubt of its being so far improved, and at a reasonable cost, as to afford much greater facilities as a navigable channel than it now possesses.

West of the mountains, the Clark's river and the Columbia are, to a certain degree, navigable so as to be of much advantage, in this respect, to the portion of the country in which they are situated, and like the other rivers named will be a valuable auxiliary to the proposed Railroad. At the points of connection with these navigable waters, places of business will spring up and grow into towns of large size. In this list St. Pauls, or St. Anthony, on the Mississippi, will hold a very conspicuous place.

The intersection of the line with the Red river of the north will be another point of importance, as this river is navigable from the place of intersection, 400 miles through a fertile and wheat growing valley, to within a short distance of Lake Winnipeg. Others will spring up where the line meets the Missouri, at or near the mouth of the Yellow Stone and at the Great Falls; also at the forks on Clark's river, at Fort Colville, and at Okanagan.

The Falls of the Missouri will become a place of much resort for those who are in search of the grand and beautiful in nature. The size of the Missouri at that place combined with its great descent of nearly 400 feet, distributed in a succession of Rapids, Cascades, and Falls through a distance of 15 to 20 miles, must, in connection with the mountain scenery, present many enchanting views, while above, a few miles from the Falls, is the *Gate of the Mountains* where the river, reduced in width, is fenced in for a distance of six miles by perpendicular walls of rock 1,000 to 1,200 feet in height. Between them the river flows quiet and deep, forming a scene of solemn grandeur in striking contrast with that presented by the Falls and Cascades below.

That the Falls of the Missouri will surpass in their attractions those of Niagara, when access is afforded to them by Railroad, will not be asserted. The two differ in character each being great in its own way, but the former, it is not doubted, will like the latter be ranked among the wonders of the world.

The country about these Falls, from the number of Buffalo, elk, and other animals that are sustained there, must have a value as an agricultural region which will enable it to support a population sufficient in number to contribute to the maintenance of a town of some magnitude.

The hydraulic power of the river which is here so conveniently arranged for use, in connection with the navigable character of the River both above and below the Falls for a long distance, must contribute greatly to the early settlement of the place and to the future improvement of all this portion of the valley of the Missouri.

COMPARISON OF ROUTES.

It has been stated, that if the mouth of the Columbia be made the terminus of the proposed Road on the Pacific, the Northern route is probably the best way to reach it. The point of divergence from this route is in the Clark's river valley, where that river emerges from the hill country, thence across the elevated prairie plain southerly, near to the junction of the Lewis' river with the Columbia, and along the Columbia to its mouth.

The distance by this line to Astoria, although greater than to the straits of De Fuca, is evidently less, (as appears by an inspection of the map,) than by any other line which can be projected from Chicago to the same point, and it is also greatly superior in other respects. If the ground between the sources of the Spokane river and Clark's river is practicable it will afford a shorter route. This, however, does not seem to be probable, judging from the description of it by Father De Smet.

Mr. Whitney, who has been very active in drawing public attention to the important subject of a Railroad to the Pacific, after canvassing various routes, came to the conclusion that it was best to approach the Pacific by the valley of the Columbia, and the route which he approves is represented on his map by a line drawn from Prairie du Chien, on the Mississippi, in Wisconsin, to the valley of White river or White Earth river, west of the Missouri; and thence to the valley of Salmon river, and down the latter and Lewis river and the Columbia, leaving the Columbia on the west side of the Cascade Range, and from thence bearing northerly to the main terminus on Puget Sound.

The objections to this line, are the crossing of the Mississippi and Missouri at points where both are navigable by the larger class of river steamers, and where the expense will be very considerable. The overcoming of the Wind river, or Black Mountains, near the head of White river, in reaching which, the line must previously pass through a very barren district of some extent, known as the *Mauvaise terres.* The impossibility of maintaining even a tolerably direct course, from the Black Mountains to Salmon river, in consequence of the direction in which the tributaries of the Yellow Stone and Missouri flow, and the number and height of the intervening monntains, the high range of the Bighorn being among the most prominent, and the probable great expense of effecting a descent along the Salmon river valley, judging from the descriptions of it furnished by Lewis and Clark, and others.

Added to this, the line will be longer undoubtedly, than the proposed route to De Fuca; a far greater amount of rise and fall must be encountered, and it will cost much more than the Northern route. The country through which it passes is less valuable for settlement, and it does not present the very great advantage of a convenient connection with Lake Superior, and with the navigable portions of the Upper Missouri, the Clark's river, and the Columbia, which is offered by the Northern route.

The character of the country through which this route must pass, after leaving the waters of White river, until it reaches those of Columbia, is very fully pourtrayed by Mr. Hunt, in Irving's Astoria. This gentleman passed, in 1811, from the Shayen river to the head waters of the Little Missouri, thence across, and along the Black Hills, or Mountains on the north or west side, and across the Bighorn range to Wind river, the main west branch of the Bighorn river. From thence across near Fremont's Peak, to the Mad river branch of Lewis river.

He describes the Black Mountains as an "extensive chain, stretching from the Nebraska or Platte river, in a northeasterly direction, to the great north bend of the Missouri." They are composed chiefly of "sandstone," and are in many places "broken into savage cliffs and precipices," and were crossed with great difficulty, near the sources of the Little Missouri. From an elevated point in this chain, he descried, at the distance of 150 miles, "the lofty range of the Bighorn Mountains, printing the clear horizon."

It is easy to see from this estimate of their distance, that the Bighorn Mountains must be very elevated, and this is proved by the difficulties which Mr. Hunt encountered in passing them. After reaching them, he pursued a southerly course along their base for several miles, searching for some practicable defile, but on the 3d of September, finding that they "still stretched onward, presenting a continual barrier," he endeavored to "force a passage to the westward, but soon became entangled in rocks and precipices which set all efforts at defiance." The Mountains "seemed, for the most part, rugged, bare, and sterile," covered by a few scattered pines. Under the guidance of the Crow Indians, he at length effected a passage "through rugged defiles, up and down the crags and steeps of the Mountains."

From thence he continued on westwardly, over a "rugged region of hills and rocks," and along the valley of the Wind river, which was "rough and destitute of trees, with few signs of animal life," passing, as above stated, across to one of the sources of Green river, and thence to the Lewis river at the mouth of Henry's fork, near the three Tetons. When upon the Wind river, he was informed that by "following up that river, and crossing a single mountain range, he would come upon the waters of the Columbia," a tributary, undoubtedly, of Mad river.

The route next south of that of Mr. Whitney, which has been proposed for reaching the mouth of the Columbia, is that usually followed by emigrants to Oregon, for reasons, principally, which make it objectionable as a route for a Railroad, viz: the almost total absence of timber for nearly its whole extent.

This route, which is delineated on the map, follows the valley of the Platte river, thence through the South Pass, across the head waters of the Colorado, and the tributaries of the Great Salt Lake; thence into the valleys of Lewis river, and the Columbia to the Pacific.

The objections to this route are of a character much more serious than to the one last described. It crosses the Mississippi and Missouri rivers, particularly the latter, at lower and more difficult points. The summit at the South Pass, which is, according to Fremont, 7,490 feet, barometric measurement, above the sea, is probably higher than that of Lewis Pass by upwards of 2,000 feet, if the latter has not been underrated. To the west of the South Pass, at the crossing of Bear Mountain, is another summit 700 feet higher, and so much higher than the Lewis Pass as to give to it a colder temperature in winter, notwithstanding its more southern latitude Even the South Pass has probably as low a temperature in winter as the Lewis Pass, *if not lower*, owing to its greater elevation, and to its being farther removed from the mild region on the Pacific.

In proceeding westward from Green river, in latitude 42° N., the valley of Lewis river may be entered without crossing any intervening ridge, or ascending much from the former. This route leads through Pierre's Hole in a northerly direction along the valley of Mad river to the mouth of Henry's fork, thence southerly to Fort Hall, etc. From the descriptions given of it by Parker, and also by Hunt, it does not appear to be practicable for a Railroad; but were it otherwise, it would not very materially change the character of this route as compared with others.

The Lewis river, for much of its distance, flows in a deep chasm, the walls of basaltic rock on either side being very high, rising in one place, for 60 miles, to from 100 to 800 feet. Its valley is, for the most part, a sterile region of volcanic rocks and barren sands, almost destitute of vegetation.

Col. Fremont says that for 300 miles to the west of Fort Hall "there does not occur a fertile spot of ground sufficiently large to produce the necessary quantity of grain or pasturage enough to allow even a temporary repose to the emigrants."

He states, that "the main river is enclosed with mural precipices, which form its characteristic feature along a great portion of its course. A melancholy and strange looking country, one of fracture and violence and fire."

Mr. Hunt, in Irving's Astoria, describes this region as a "dreary desert of sand and gravel," a "vast trackless plain destitute of all means of subsistence." "Here and there is a thin scanty herbage. insufficient for the pasturage of horse or buffalo." These "treeless wastes," he continues, "are even more barren than the naked upper prairies on the Atlantic side, and must ever defy cultivation." Farnham, when near the Boisse river, on his way west, "had not seen an acre of land since leaving Fort Hall, capable of producing the grains or vegetables," so sterile was the face of the country.

A Railroad located along this valley, instead of pursuing the short route followed by the emigrants, over the Blue mountains, which by Col. Fremont's measurement, are 5,000 feet high in the lowest place, must follow the circuitous course of the Lewis river. This, with the great deviations from a direct course at other points, must obviously render the entire distance very much greater than by the Northern route.

This route, after leaving the lower and only fertile portion of the valley of the Platte, passes through a comparatively barren and impracticable region for nearly the entire distance to the Blue Mountains. Lieuts. Turner and Hunter, who traversed the Platte valley in 1845, state that from long. 98¼° W. to Fort Laramie, "the country is barren and desolate, being without timber or grass, except on the very banks of the streams, and very little even there. From Laramie, for some distance west, the road runs over hills of coarse gravel." * * "The only grass is along the borders of the streams, with very little timber any where, except on some of the high banks, which are perfectly inaccessible to wagons."

"The Sweetwater is bounded on both sides by mountains of granite, frequently intersected by dykes of trap, not timbered. Distance between mountains on each side 20 miles, but this district of country is very barren, producing nothing but wild sage." "In the Pass there is no timber, and none in its vicinity except on the Wind river mountains, which are inaccessible to wagons."

The cost of the Road on this route will be vastly greater than upon the Northern route, owing to its greater length, the absence of timber, the general character of the surface, and the impossibility of approaching it at any intermediate points with materials for its construction, or with provisions for the sustenance of laborers. When built it will be more expensive to operate. It will not pass through a region attractive to settlers, and will not, consequently, have the amount of way business to sustain it, which will be realized upon the Northern route, and like the one last described, has not the advantage of a connection with Lake Superior.

These are the only routes proposed, and probably the only ones practicable; (if the two last can be considered practicable,) which have a terminus on the Pacific in either of the territories of Oregon or Washington. The connection with San Francisco of the South Pass route continued to the eastern boundary of California will be attended with difficulties, as will be seen farther on, much more serious than those likely to be met with on a continuation of the same route to the mouth of the Columbia.

Before proceeding to consider the character of the more southern routes which lead to the ports of San Francisco and San Diego, and which more naturally, perhaps, take their departure from St. Louis, or some point farther south, it will be proper to give a general topographical view of the country between the Mississippi and the Pacific, in that direction.

Between the Mississippi and Missouri rivers on the one side, and the eastern base of the Rocky Mountains on the other, lies a vast plain, inclined at such an angle as to give to its northwestern edge or border, where it meets the mountains, an elevation of 5,000 feet, and upwards, above the sea, and its southwestern edge towards the Mexican boundary, about 4,000 feet above the same level.

The surface of this plain, as a whole, is not enough varied to give to it the character of being diversified with hills and valleys of any very great height or depth. It has what is termed, a rolling or undulating surface, a character which is only interrupted by the many broad and deep ravines, through which flow the numerous tributaries of the Mississippi and the Missouri, which have their source in the mountains, and which from their great descent, amounting to from four to seven feet per mile, flow with great rapidity, and are, in consequence, so obstructed with bars and shoals, as to be unsuited for navigation; and from the character of their channels, can probably never be improved for that purpose, except at a cost not justified by any resulting benefit.

The eastern portion of this great plain, which is from two hundred to three hundred miles in breadth, is very fertile, is tolerably well supplied with timber, and is capable of affording sustenance to a very large population.

The western portion becomes less and less fertile as it approaches the mountains, where, from its great elevation, and other causes, it presents so barren and sterile an aspect, as to have received the name of the *American Desert.* This portion is almost wholly destitute of timber, and in many places, is destitute of water, except what is furnished by the larger streams which flow from the mountains. So bare of timber is this portion, that in the valley of the Platte, for four hundred miles, it is, from the authorities quoted above, almost entirely wanting, a peculiarity not confined to that river, but is said to be common to all; and even when they lose this character and are fringed with trees, as is occasionally the case, the latter are found to consist mainly of the cottonwood, (*populus canadensis,*) which affords an inferior timber, and is but poorly, if at all, adapted to the purposes of Railroad construction.

The Rocky Mountains, south of Fremont's Peak to the Mexican boundary, may be said to consist of two ranges, between which flow the waters of the Colorado, which discharges into the Gulf of California. The eastern or main range on reaching the lat. of 39° N. nearly, is accompanied in its course south by another parallel range, at no great distance from it on the east, and between the two lies the narrow valley drained by the Rio Grande, (or Bravo,) Del Norte, which, after forming for some distance the boundary between the United States and Mexico, discharges into the Gulf of Mexico.

These mountains are strictly what their name denotes, viz: *Rocky*. They are very sparsely covered with timber, irregular in form, and unequal in elevation, rising to a height from 10,000 to 12,000 feet above the level of the sea, with occasional peaks that rise to a still greater height, and which are covered with perpetual snow.

The valley of the Rio Grande Del Norte is elevated at its northern extremity about 8,000 feet above the level of the sea, and at the point where it emerges from the eastern range of mountains at El Paso, its elevation is 3,812 feet. The descent of its valley from lat 35° N. to El Paso varies from 5 to 7 feet per mile; the river is, consequently, not navigable The valley is narrow and has within it many fertile spots, and contains a Spanish and Indian population of several thousand.

The valley of the Colorado has a descent to the south, even greater than that of the Rio Grande Del Norte. Although narrow at first it widens as it proceeds south, until it occupies most of the space between the main range of the Rocky Mountains and the Pacific.

At its source, in lat. 43° N., its elevation above the sea is upwards of 7,000 feet. Col. Emory informs us that "there is little doubt of its being always navigable for steamboats up to within 3 or 4 miles of the mouth of the Gila, where it is 600 feet wide." He was also informed that it was probably to a great extent susceptible of navigation to a point seven days travel up from the junction, which would bring it within two or three hundred feet of the level of the sea in lat. 34° N. This gives to the valley above, an inclination on the average, of nearly ten feet in the mile; and an elevation, probably, between the latitudes of 38° and 39° N., of about 3,000 feet. Its eastern and western borders in this latitude, have an elevation of about 5,000 feet.

The mountains which bound it on the west, like those on the east, are high in places, but the chain appears to be more broken.

They skirt the Great Salt Lake on the east, and are there know as the Wausatch range. From a point near the Vegas of Santa Clara, in lat. 38° N., they pursue a westerly course until they strike the high range of the Sierra Nevada, in California. This latter then forms the western boundary of the Colorado Basin, being the only range between it and the Pacific, and can be passed near San Diego at an elevation, according to Col. Emory, of 3,000 feet.

West of the Colorado valley, and east of the Sierra Nevada Mountains, and south of the mountains which form the southern boundary of the valley of Lewis river, is a wide space known as the "Great Basin," its surface elevated, as appears by the measurement of Col. Fremont, from 4,000 to 5,000 feet above the sea. The lowest Passes in the Nevada Mountains have an elevation nearly twice as great as the interior of the basin, and the higher portions rival those of the Rocky Mountains in height, their summits being, at all seasons, white with perpetual snow.

Between these mountains and the sea, north of lat. 34, is another parallel range of mountains, which are high, and known as the *Coast Range.* Between the two lie the valleys of the San Joaquin and Sacramento rivers, the former descending to the north, and the latter to the south; their waters meeting in the Bay of San Francisco, which opens to the sea by a passage through the Coast Range, presenting a strait of ample dimensions, easy of access, and a sufficient depth of water in the Bay, in most places, for the purposes of ocean navigation.

The Nevada Mountains, on both of their slopes, are covered with a dense forest which extends in places on the west side, on to the plains below.

The Coast Range south of San Francisco is thinly clothed with timber. The valley between this and the Sierra Nevada is fertile and productive wherever the ground can be irrigated, a method of culture which is necessary, owing to the almost total absence of rain in summer.

Fortunately in the valley of the San Joaquin, the streams are numerous, and on the side of the Sierra Nevada, are said to be ample for the purpose.

East of the Nevada the "Great Basin," is characterized by its sandy and barren plains; by the number and rugged character of the mountains that are scattered over its surface; by its destitution of timber; by the fewness of its fresh water springs and streams; by its containing the Great Salt Lake, and many minor lakes, some salt, and some otherwise, the most of which have no apparent connection with each other, and none with the sea; a region where the rains are limited and the evaporation so great as to drink up all the moisture, leaving but little for the sustenance of plants or animals.

To this description, the country near the Great Salt Lake, where the Mormons are located, is somewhat of an exception. In this section there are some fertile strips of land in the valleys, which, if not naturally productive, are made so by the somewhat expensive process of irrigation. Aside from this, the whole of the Great Basin is a dreary and probably irreclaimable desert, supporting but few animals, and a few miserable specimens of humanity, the most abject of the Indian race to be found anywhere in North America.

Thornton, who passed through a portion of this barren waste, speaks of the "destitution of moisture," describes its "sterility and dreariness as fearful, as though a strange curse were brooding over the whole scene." "A country which has nothing of a redeeming character." "It was enlivened by the murmur of no streams, but was a wide waste of desolation where even the winds had died."

Col. Fremont, when struggling through the deep snows of winter on its western border, under the Nevada Mountains, was informed by a Christian Indian that "the country directly across to the Great Salt Lake had repulsed, by its sterility, all attempts to penetrate it" When traversing, subsequently its eastern limits he states that "fertility of soil and vegetation does not extend far into the Great Basin," that it is "called a desert, and from what he saw of it, sterility may be its prominent characteristic." "Humanity there appears in its lowest form," subsisting on "seeds, insects and roots." "The rabbit is the largest animal," and, "the wild sage the only fuel and timber, and the only covering often for the feet and legs in cold weather."

Bryant, who passed centrally through this region, from the Great Salt Lake, by the way of Humboldt or Mary's river, to California, thus speaks of it:

"A fine white sand, impalpable almost as ashes mingled with which is a scorious gravel, in some places soft and yielding to the hoofs of our mules, in others baked and compact almost to the hardness of brick, are the leading characteristics of the *soil*, if soil it can be called." When at the distance of ninety miles the scene is represented as one of "dismal and oppressive solitude," "no voice of animal, no hum of insect disturbing the tomb-like solemnity. All was silence and death. Like the other elements sustaining animal and vegetable life, the winds seemed stagnant and paralyzed by the universal dearth around." A vast plain of 70 to 80 miles in width, which they were compelled to cross, was "utterly destitute of water and of vegetables, or any sign that shrub or plant had ever existed above its snow-like surface." In other places, wild sage, grease wood, and a few shrubs of smaller size, for the most part leafless, "were the only vegetations, except at long intervals a little grass, these mostly dry, and this only in the immediate vicinity of the few springs to be met with, whose water was often too brackish for use." At the distance of two hundred miles, after taking an extensive view from the summit of a mountain, he states "that no words can describe the awfulness and grandeur of this sublime desolation." At about three hundred and thirty miles there appeared "little or no variation in the general character of the country and its productions." At 450 miles no improvement. The nearest mountains present the same rugged and barren aspect.

At 575 miles he states that "every thing around is sufficiently cheerless and desolate to depress the most buoyant temperament. The sable and utterly sterile mountains, the barren and wild plains, incapable of sustaining either insect or animal, present a dreariness of scenery that would be almost overpowering in its influences, but for the hope of more pleasing scenes beyond."

This entire region is supposed at no very remote period to have been under the influence of volcanic fires, and such doubtless is the conclusion which the general character of the surface would seem to justify. But it should be remembered that time can effect but very slight changes in the surface of a country in the absence of rain or moisture, and that this element appears to have been almost entirely wanting in the region in question; and this is one reason probably in common with the milder climate, why the entire country from the eastern slope of the Rocky Mountains to the Nevada Mountains exhibits indications of volcanic action of a date apparently more recent than is observed in those sections where the rains are frequent, and the cold and the frosts at times severe.

The change in the face of nature which in another climate would be effected in a short period, would here take years to accomplish, owing to the almost entire absence of the causes by which such changes are produced.

The region lying south of the Great Basin and west of the Colorado, extending to the Nevada Mountains, and in the vicinity of San Diego, approaching near to the Pacific, is less mountainous but equally barren and sterile. Colonel Emory, who was one of the gallant band who accompanied Gen. Kearney in his march to California and whose attention to the physical characteristics of the country, and care and perseverance in determining the astronomical positions, and elevations of numerous points on the route, (under the privations of a forced march through a hostile and most inhospitable region,) is worthy of remark and commendation, says, after reaching the mountains west of the Colorado, that the "desert over which we had passed from water to water, is an immense triangular plain, bounded on one side by the Colorado, on the west by the Cordilleras of California, on the south by the Tecati chain of mountains and the Colorado mountains." On the north its boundaries are undefined but he supposes "from accounts of trappers and others who have attempted the passage from California to the Gila by a more northern route, that it extends many days travel beyond the chain of barren mountains which bound the horizon in that direction "

This desert, he states, is "chiefly covered with floating sand, the surface of which in many places is white with diminutive spinelas and every where, over the whole surface, is found the large and soft muscle shell."

The valley of the Gila for at least one hundred miles east of the Colorado appears to be of a similar character. He says that "wherever we mounted to the table lands to cut off a bend of the river, we found them dreary beyond description, covered with black basalt, with a few intervals of dwarf growth of *Larrea.* Now and then a single acacia raised its solitary form and displayed its verdure in the black expanse." Again "the ground as far as the eye can reach is strewed with black shining well rounded pebbles. The Larrea even was scarcely seen, and dreariness seemed to mantle the earth. The dust rose in volumes as the party advanced." "The hills and mountains appeared entirely destitute of vegetation." As they approached the Colorado, the table lands and plains were almost entirely of sand." "Sand hills flank both sides of the Gila formed by sand brought down by the winds from the valley of the Colorado," "the course of the Colorado was tracked by clouds of flying sand." West of this great sand plain, in the mountains near San Diego, the country is alike destitute of vegetation. When in the midst of the mountains he states that "barrenness and desolation still hold their reign," and that the "barren waste" extends to the *very shores* of the Pacific.

Col. Fremont who traversed this region from Walker's Pass in the Nevada Mountains to the Vegas of Santa Clara, five hundred and fifty miles, also describes it as being "little better than a sandy desert, a region of loose, heavy sands," "hot and yellow," in which the traveller "suffers from an intolerable thirst;" "where the heated air seems to be entirely deprived of moisture." "A desolate and revolting country, where lizards were the only animals, and the tracks of the lizard eaters the principal signs of human beings." Other authorities concur in giving to this portion of the valley of the Colorado a similar character. This whole region in fact, including the Great Basin, being nearly or quite destitute of water, is irreclaimable even by irrigation and must forever remain, probably, the Sahara of North America.

The vast region lying to the east of the Great Basin and the southern part of the Colorado, including the Rocky Mountains and what has heretofore been designated on the Maps as the "American Desert," on their eastern slope, although not presenting so melancholy and forbidding an aspect as the portion west of the Colorado, is still in a great measure a barren waste, made up of sterile plains, and mountains of almost naked rock.

Col. Emory whose route was by the way of Bents Fort and Santa Fe, thence down the valley of the Del Norte and across to that of the Gila, states that "the country from the Arkansas to this point (junction of the Gila with the Colorado) more than twelve hundred miles, in its adaptation to agriculture has peculiarities which must forever stamp itself upon the population which inhabits it." "In no part of this tract of land can the rains of heaven be relied upon to any extent for the cultivation of the soil. The earth is destitute of trees, and in great part also of any vegetation whatever."

"A few feeble streams flow in different directions from the great mountains, which in many places traverse this region. These streams are separated, sometimes by plains and sometimes by mountains, without water, and without vegetation, and may be called deserts, so far as they perform any useful part in the sustenance of human life. The cultivation of the earth is therefore confined to those narrow strips of land which are within the level of the waters of the streams, and wherever practised in a community with any success, or to any extent, involves a degree of subordination and absolute obedience to a chief, repugnant to the habits of our people."

The region thus described is applicable not merely to the portion passed over, but to the whole of New Mexico. The Province of Chi-hua-hua in Mexico, and California as far north as the Sacramento, all of which, he states, are, as far as the best information goes, "the same in the physical character of their surface, and differ but little in climate or products." In this description may probably also be included the Mexican Province of Sonora.

Col. Emory "made many inquiries as to the character of the vast region of country embraced in the triangle formed by the Colorado of the West, the Del Norte and the Gila" From all that he could learn, this country "does not differ materially in its physical character from New Mexico, except perhaps being less denuded of soil and vegetation. The sources of the Salinas, the San Francisco, Ariel, San Carlos, and Prieto, tributaries of the Gila take their rise in it. About their head waters and occasionally along their courses are presented sections of land capable of irrigation." "The whole extent, except on the margins of the streams is said to be destitute of forest trees."

Farnham who crossed the upper portion of the Colorado valley from St. Vrains Fort to Salt Lake describes it as a "desert of arid plains and minor mountains," the "great grave of vegetation." The face of the country, even in the valley of Green river is a "dry, barren and undulating plain." He could find nothing in nature from which to derive a pulse of pleasure, nothing "save the vastness of desolate wastes, the tombs of the washings of the floods!" The course of the Grand river, to the point where he crossed it, was nearly due west. From thence, according to Kelly, a man who was familiar with its course and that of the Colorado, it "continued in a west by north course for one hundred and sixty miles where it breaks through the Anahuac ridge." The cliffs at this point on both sides are "several hundred feet high and overhanging; within them is a series of cascades which roar like Niagara, when the river is swelled by the freshets of June."

After passing this point it moves with a "dashing, foaming current" to where it meets with Green river and forms the Colorado, of the West. "From the junction of these branches, the Colorado has a general course from the north east to the south west, of seven hundred miles to the Gulf of California. Four hundred of this seven hundred miles is an almost unbroken chasm with perpendicular sides, hundreds of feet in height, at the bottom of which the waters rush in continuous cascades." "The country on each side of its whole course is a rolling desert of brown, loose earth on which the rains and dews never fall"

This description, he says, was confirmed by many persons at Fort David Crocket, and it sustains fully the general description by Col Emory.

It is also confirmed by the testimony of Dr. Lyman, who travelled in 1841 from Santa Fe to Upper California. For the first one hundred and fifty miles to the Rio San Juan, the pasturage and water were both good upon the mountain sides and valleys. After crossing the San Juan in about lat. 38° N., and continuing along the Grand to the Green river tributaries of the Colorado, he states, that "the country becomes generally sterile and broken in every direction by deep ravines with perpendicular banks, opposing almost insurmountable obstacles to the traveller's progress, compelling him to search many days before he can find a feasible passage."

He states that the water in nearly every instance west of the Colorado to the California mountains, a distance of seven hundred to eight hundred miles, "is either very brackish and slimy or so excessively saline as to have, in many instances, a fatal effect on animals and men." In some few instances good water was found. Sometimes the vast barren plains were destitute of any water, having hardly a blade of grass, on a square mile of surface! Occasionally wild sage was found and this and the stems of equally naked bushes, were the only food for animals. Occasionally, also, a few diminutive "canes" and sand grass were found in the dry beds of rivers. "Over these dreadful wastes, scathed of God, was scattered the wild squash which only served to tantalize the perishing traveller with the remembrance of fruitful fields and pleasant homes."

In journeying down the Colorado the traveller "comes to a spot called Santa Clara where a little herbage and water are found. Near this point the banks rise and the river is buried deep in roaring chasms. The traveller ascends, therefore, to a point called the Salt mountain and thence descends to Las Vegas where there are about one hundred acres of salt grass. There a desolate plain commences and extends about one hundred miles, partially covered with loose sand piled into ridges, curiously waved over the general surface and in the ravines, whirled by the winds into a great variety of fantastic forms. These ravines are very numerous and deep, very difficult to ascend and descend; parched caverns into which the drifting sands are driven by the heated winds. On all this plain there is no vegetation except a little salt grass on the margin of a few stagnant pools of brackish and sulpurous waters." From thence to the California mountains the soil was quite hard, the water continued the same and the whole face of the country equally devoid of vegetation.

Such being the general character of the country, the capacity of the several streams for supplying the means for irrigation, becomes an important element in estimating the population which can be sustained within its limits.

Col. Emory measured the Del Norte at Tomi, lat. 36° 48′ N. and found it thirty yards wide only at the surface, and averaging less than two feet in depth. This was its entire section on the first of October, except two zequias or channels for irrigation of 9 by 2 feet each, at a place distant *three hundred miles* in a direct line from its source! At the Pimos village, the waters of the Gila, over three hundred miles from its source, were entirely abstracted from their bed by the zequias formed for irrigation! The great Colorado of the West, at the place where it was forded by Gen. Kearney *below* the mouth of the Gila was only 1500 feet wide on the 25th of November. Its greatest depth in the channel was only four feet, and it flowed at the very moderate rate of 1½ miles per hour!

Altogether equal to a volume of water two hundred feet wide, and 20 feet deep running at the slow rate of one and a half miles per hour, for the drainage of 80,000 square miles of surface; less probably than *one-seventieth part* of the drainage from the same extent of surface on the slopes of the Alleghanies between the same latitudes.

To what degree this amount, small as it is, would be reduced by the increased evaporation and absorption consequent upon the diversion of the waters of the main rivers and their tributaries to any very considerable extent for irrigation, will be left to others to estimate. It will be found, doubtless, that the population which can be sustained, will not depend solely upon the extent of surface which is "within the level of the waters of the streams," but will be governed also by the *quantity* of water which the streams are able to furnish.

Whatever portion of the surface can thus be rendered available, and it must be very limited, it is very certain that the more desirable and accessible regions to the north will be first occupied, and that they will contain and support a population manifold greater on a given surface, whose pursuits will be of a character to contribute in a much greater degree to the support of expensive means of inter-communication.

In respect to the several routes proposed for a Railroad to the Pacific, through the region of country under consideration, it will be seen from what has been stated above, that the Sierra Nevada Mountains constitute a much more formidable obstacle to the proposed Road than do the Rocky Mountains proper.

They rise to a very great height, from 4,000 to 11,000 feet above the level of the "Great Basin," or 10,000 to 15,000 feet above the level of the sea. Col. Fremont, who effected a passage across them in the winter of 1845, found the elevation of the Pass, at the source of the American river, a branch of the Sacramento, to be 9,338 feet.

Such is the nearness of this elevated Range to the Bay of San Francisco, and such also its height, as to discourage the idea of overcoming it by any direct route for a Railroad, to say nothing of the repulsive and impracticable character of the Great Basin, which must be crossed by a line thus located, and consequently, attention has very properly been directed to two Passes near the southern extremity of the range which lead from the valley, occupied by the Tulare Lake and its tributaries, (which is distinct from the San Joaquin,) to the valley of the Colorado, known as the Walker and Tejon Passes.

These Passes are about 60 miles distant from each other, and are reached from San Francisco by a route leading at first southerly to the south point of an arm of San Francisco Bay, which juts down in that direction. Thence northwardly around the north side and near the base of Mount Diabolo, a point in the Coast Range, 3,750 feet high. Thence turning southerly and rising from the level of the Bay, passing up the valley of the San Joaquin, and through that of the Tulare Lake, to the summit at one of the Passes which separate the waters of the latter lake from those which flow towards the Colorado.

Of the two Passes named, Walker's is the most northerly, and is situated, according to Fremont, in lat. 35° 17′ N. and long. 118° 35′ W., and has an elevation, probably, of about 5,000 feet above the sea.

It is distant from San Francisco, by the route described, not less than 360 miles, and is only *seventy* miles in a direct line from the shore of the Pacific.

From this Pass three distinct routes to the valley of the Mississippi have been proposed.

One of these, advocated especially by the St. Louis interest, proceeds from Walker's Pass northeasterly to the Vegas de Santa Clara, on the Rio Virgen. Thence easterly to the Colorado. Thence up the Grand river branch of the Colorado, and across by what is called, the Cochatope Pass, in the mountain range between the Colorado and Del Norte, to near Fort Massachusetts, situated in the Del Norte valley, near the latitude of 38° North. Thence passing by Bent's Fort on the Arkansas river, to the Smoky Hill Fork of the Kanzas river, and down the valley of the latter, across the State of Missouri to St. Louis, a distance from San Francisco of 2,160 miles, estimated as follows:

From San Francisco to Walker's Pass, -	360 miles.
From Walker's Pass to St. Louis, direct line,	1,582 "
Add to latter for deviations from direct line 12 per cent, same as allowed on the northern route, - - - - - - -	188 "
Total, - - - - - - -	2,130 "

From the best information to be obtained, it is highly probable that Walker's Pass is impracticable, and that the line must be carried to the Tejon Pass, farther south and west, which is said to be lower, and which, although not altogether free from difficulties, is much the most favorable of the two. This will lengthen the line, probably, eighty miles, making the entire distance 2,210 miles, or say 2,160 miles, assuming, what is not very probable, that the line may be shortened 50 miles by crossing the Coast Range south of Mount Diabolo. This estimate makes this line to St. Louis 200 miles longer than the line from Chicago to De Fuca, and 560 miles longer than from the west end of Lake Superior to De Fuca.

The second route refered to, leads eastward from the Tejon or Walker's Pass, across the valley of the Colorado, near the latitude of 35° N., to that of the Rio Grande Del Norte, crossing the latter a little south of Santa Fe, near Albuquerque or Per Alta. Thence on to the valley of the Canadian river, and terminating on the Mississippi at some point south of, and not far from, the mouth of the Ohio.

This is very nearly the route proposed in the Bill of Senator Gwynn, which was before the Senate of the United States at its last session.

That route as delineated on the map accompanying the Bill, had four termini on the Mississippi and one on the Gulf of Mexico, in Texas, with an extension at the opposite extremity from San Francisco to Puget Sound.

The distance by this route from San Francisco to Memphis, one of the proposed termini on the Mississippi, was estimated at 2,000 miles. A computation similar to that made on the route to St. Louis, makes it more than this, viz:

From San Francisco to Walker's Pass, - -	360	miles.
From Walker's Pass to Memphis, direct, -	1,604	"
Add to latter for deviations from direct route, say ten per cent., or two per cent. less than upon the route to St. Louis, - - -	160	"
	2,124	"
Add estimated increase by Tejon Pass, - -	66	"
	2,190	"
Deduct for passing south of Mount Diabolo, -	50	"
Total, - - - - - - - -	2,140	"

The route from San Francisco to Memphis is, therefore, by this estimate, 180 miles longer than from Chicago to De Fuca, and 540 miles longer than from the west end of Lake Superior to De Fuca.

The Tejon Pass is at the junction of the Sierra Nevada with the Coast Range. Not far from this point are openings in the Coast Range which are supposed to offer a more direct route to San Francisco than by the Tulare and San Joaquin valleys, but the country between the Coast Range and the Pacific is less productive, not being as well watered in summer as the valleys of Tulare and San Joaquin, which are supplied by the numerous streams from the Nevada Mountains. The Western slopes of the latter include, also, most of the *placers* in which gold is found, and it is here that most of the population of southern California will, probably, be situated, and it is only, also, from the San Joaquin valley, that a *continuous* line of Railroad can be conveniently carried to the Sacramento valley, north of the Bay of San Francisco, considerations of great importance, all indicating the San Joaquin valley as the most suitable for the location of the proposed Road.

The third route leads from Walker's or the Tejon Pass to the mouth of the Gila, on the Colorado, 50 or 60 miles from the mouth of the latter. Thence up the valley of the Gila, and across the elevated Plateau, which lies parallel nearly with the Mexican boundary, to the valley of the Del Norte. Thence down the latter a short distance to El Paso; and from El Paso through the northern part of Texas to the Mississippi, at a point or points which will best concentrate the travel and business of the States east of that river.

The distance by this line from Memphis to San Francisco is greater than by the route last named, and cannot be estimated at less than about 2,200 miles. This result is obtained by adding fourteen per cent. only to the direct distance from Memphis to Walker's Pass, and increasing the amount by the estimated distance to San Francisco, as given upon the other routes, to the same point. This is also, probably, about the distance by the same route between San Francisco and New Orleans, diverging at Trinity river, in Texas, and passing through Logansport.

If the terminus of this route on the Pacific is fixed at San Diego, instead of San Francisco, the distance to the points named on the Mississippi, will be about 400 miles less, or about 1,800 miles in all, and if a terminus be made at Galveston, which is said to be the best port for large vessels in Texas, the distance will be still further reduced about 300 miles, making the distance from Galveston to San Diego 1,500 miles nearly, and to the Colorado river 1,320 miles.

Of these several routes, the two first traverse the entire breadth, east and west, of the comparatively unproductive region already described, including what has hitherto been called the American Desert, on the east of the Rocky Mountains, and the entire country west to the Nevada Mountains. A region comprising a distance of at least 1,000 miles, upon either of the routes, and which, west of the Del Norte valley, is, with few exceptions, a nearly barren region, without timber, and in many places without water, having few attractions for settlers. A region containing no navigable streams, by means of which, materials and provisions can be conveyed to the line of the road while building. On the contrary, materials and provisions for the entire length of both routes must be mostly conveyed from the two extremes of each; and it is only by this tedious and expensive process that a road upon either can be constructed, and the fuel which is to furnish the power by which they are to be operated, and the necessary materials for renewals and repairs, must be charged with the cost of transportation for hundreds of miles upon the road, and the water, without which the iron horse, all powerful as it is, is impotent, must, for several hundred miles on either route, after being sought for in vain from the barren sands beneath, or the brassy heavens above, be obtained at great cost by digging deep into the earth, or by forming artificial channels leading from the streams where the flow of water is permanent, to convenient points on the line of the Road.

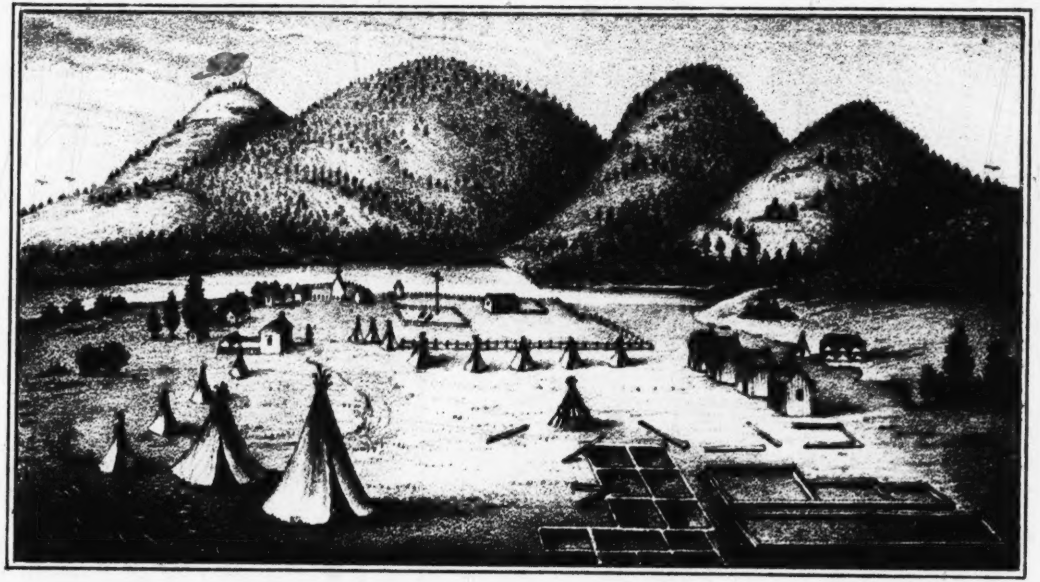
Such is the general character of the two most northern of the three routes leading from Walker's or the Tejon Pass to the Mississippi, either of these being longer than the Northern route from Chicago to the Pacific, even should their directness be improved by the finding, which is not probable, a practicable pass across the Nevada Mountains by the valley of Owens Lake and Kings river.

Either of these routes, estimating from the Mississippi river to San Francisco, has a much greater rise and fall in the aggregate than is found on the Northern route. This will be apparent so far as the northernmost of the two routes is concerned, when it is considered that the summit between the waters of the Rio Del Norte and Colorado is probably 8,000 feet above the sea. This summit is upwards of 300 miles north of San Felippe, where the Rio Del Norte, by Col. Emory's measurement, is 5,158 feet above the sea. By his measurement, also, the valley of that river for some distance below San Felippe to near the Mexican boundary is inclined at the average rate of six feet, nearly, per mile, and as rivers usually descend most rapidly near their source, it is not unreasonable to suppose that the valley above San Felippe rises at the average rate of at least 10 feet per mile, which gives for the probable elevation of the summit the amount above stated.

The elevation of the surface at the Vegas de Santa Clara, west of the Colorado, according to Fremont, is 5,200 feet. The Colorado at the crossing, or at the point rather, where the line would leave that river, is not higher, probably, than about 3,000 feet. Add to this the ascent of the Nevada summit at Walker's Pass, or the Tejon Pass, and the descent therefrom to the Pacific; also the rise and fall incurred in passing from the valley of the Smoky Hill Fork of the Kanzas to that of the Arkansas, and from the latter to the valley of the Del Norte, and in surmounting the many secondary ridges or ranges into which the surface of the country is broken for the entire distance from the Del Norte valley to the Pacific, and it makes, at the lowest reasonable estimate, a total rise and fall, as stated above, very greatly exceeding what will be encountered upon the Northern route.

If a comparison is made in this respect with the next route passing near Albuquerque south of Santa Fe, a similar result will follow; showing, probably, if any thing, a greater difference in the total rise and fall in favor of the Northern route. Upon this route the same Pass over the Nevada Mountains may be adopted. The Colorado must be crossed lower down or nearer to its mouth, and consequently at a much lower level, that river having but little descent, comparatively, below the parallel of 35°. There is at present no evidence by which a lower summit can be infered between the Colorado and the Del Norte. The line crosses the Del Norte at a lower level, and the ascent may be greater in leaving the valley of that river to pass over into that of the Mississippi. Altogether the entire rise and fall on this route will, probably, be found to be as great, if not greater, than upon the route next north leading to St. Louis. In addition to this it should be noticed that the terminus, on the Mississippi, of this route at Memphis, is farther removed from New York city than is St. Louis, an objection which applies with still greater force to the third line near the Mexican boundary.

This latter line has features which are different from the two last named After leaving Walkers or the Tejon Pass, it descends



ST. MARYS CLARK'S RIVER VALLEY.
From De Smets Oregon Missions.

nearly to the level of the sea at the crossing of the Colorado From thence, unless permission is obtained to carry it over better ground through Mexican territory, it must be kept in the valley of the Gila until it attains a suitable point in the latter for passing on to the great plain which extends through to the Del Norte, and which is supposed to have an elevation of 4,500 to 5,000 feet above the level of the sea.

From this plain, which is covered with detached or isolated ridges or mountains, and which from its low elevation marks the division between the Rocky Mountains on the north, and the Mexican Andes or Cordilleras, the line descends the valley of the Del Norte to El Paso, which is elevated, by barometric measurement, 3,812 feet above the sea. Thence rising from and leaving the Del Norte valley it traverses the northern portion of Texas and has a rise and fall, when it reaches the Mississippi, as great, probably, if not greater, than is encountered on either of the two routes next north of it; so that in this particular and in that of distance, it has no advantage over either of those routes, estimating from the Mississippi at one extreme, and San Francisco at the other.

In another view it possesses advantages which do not attach to the two other routes named, and which will, probably, be considered as entitling it to more consideration. Those consist in its entire freedom from snows, and in the connection which can be made from it with San Diego on the Pacific, and the Ports of Texas on the Gulf of Mexico, and also with the Gulf of California. This route, from all accounts, passes from the Mississippi to the Del Norte through a generally fertile region, very well supplied with timber for two-thirds of the distance, to where it meets the southern part of the Llano Estacado or Staked Plain, but west of the Del Norte to San Diego, a distance by the line of the road of probably 800 miles, the country, according to Gen. Kearney, is "destitute of timber, producing but few cottonwood and mesquite trees," and "very little grass or vegetation, owing to the dryness of the climate." This portion traverses the high and dry plain described between the Del Norte and the Gila, and the sand-plains and deserts which extend from the lower part of the valley of the Gila to the Pacific; features, which upon this route and the two next north of it, present difficulties and obstacles to the construction and successful operation of a Railroad, of a nature far more serious than can possibly be experienced from the cold and snows upon the Northern route. To this should be added the apprehensions in regard to the character of the climate, which, whether they have any just foundation or not, will serve to enhance greatly the cost of the work, and when finished, will, at certain seasons, induce travellers to give their preference to a more northerly route, if such a route is offered for their choice.

The connection with San Francisco by this route may be shortened, as described in the case of the two routes to Memphis and St. Louis, by passing on the west instead of the east side of the Coast Range. The objections which were urged to the adoption of this course also apply to this route. The distance by it from Galveston to the Colorado is between 1,300 and 1,400 miles, and should a shorter connection be made with the Gulf of California in what is now Mexican territory, by carrying a line from some point not very far to the east of the San Pedro branch of the Gila across the Province of Sonora to the nearest point on the Gulf, the distance from ocean to ocean will still be from 1,200 to 1,300 miles.

A line thus located may possess some importance in reference to the trade with Australia and the islands of the South Pacific, but even this importance is greatly lessened in view of the undoubted superiority of the shorter lines situated farther south, across the Isthmus for accomplishing the same object.

Notwithstanding this route has superior merits in a commercial and military view, and in its entire freedom from snows, and its less distance from ocean to ocean, compared with the two next north of it; it does not, it must be obvious from all that has been said, possess the characteristics which are requisite to render it the great commercial thoroughfare between the Atlantic and Pacific, to an equal degree with the Northern route. On the contrary it is exceedingly doubtful, as will be shown hereafter, whether if constructed it can command any very considerable portion of the business and travel between the Bay of San Francisco and the leading cities of the Atlantic.

In respect to the time required for building, and the cost of construction of the several routes, there will be found a vast disparity in favor of the Northern route, compared with either of the other routes named.

As already stated neither of the routes leading to San Francisco can be approached at any intermediate point between the Mississippi or Missouri and the Pacific, for the delivery of materials or supply of provisions, unless it be at one point on the most southern line near where it crosses the Colorado. At every other point on this route, and at all points on the other two, the iron rails with their fixtures, the materials for the stations and depots, and the provisions for the sustenance of the laborers must be transported from the extremities of the road, or otherwise conveyed by teams from distant points at a very great cost.

In another place an opinion has been expressed as to the probable cost, under certain circumstances, of the Northern route and of the branch of 220 miles connecting it with Lake Superior. In that estimate the entire cost is placed at $100,000,000.

This estimate is, of course, based mainly upon such descriptions of the country as were most reliable, and is according to the best judgment of the writer, who has had no inconsiderable experience and knowledge of the cost of railroads in various portions of the country for the last twenty-five years.

An opinion formed in a similar manner, upon data of a like character, in respect to the Southern routes, makes the probable cost of either, vastly greater than that of the Northern route. This results from their greater length; the less favorable character of the surface; the probable greater amount of rock; the almost total absence of timber for much of the distance; their inaccessibility; the greater difficulty of securing labor; and the very much greater length of time required for their construction, producing a large interest account, and preventing early returns upon the capital invested.

This is true of the routes from St. Louis and Memphis crossing the valley of the Del Norte. It is also in a great measure true of the most southern route.

No very correct or satisfactory opinion can be formed of the probable cost of either of the lines leading from St. Louis, or from any of the points named, south of that city, to San Francisco or San Diego, owing to the peculiar character of the country west of the Del Norte; since in all the varieties of railway construction in this country, or in Europe, no parallel can be found to the circumstances which exist on those routes.

Upon each of them for a distance of 700 miles and upwards, during that season when the sun is most powerful, scarcely any rain descends to moisten the dry and parched ground, and lay the clouds of dust which are raised and swept by the winds over its treeless surface; and the little that falls at other seasons is not sufficient, in most places, to produce any appreciable effect upon the thirsty soil, and none at all where the surface is of the character represented in the vicinity of, and for a number of miles west of, the Colorado, viz: a waste of drifting sands unstable and changeable, nearly, as the waves of the sea.

In a region of this character, it remains yet to be ascertained, how much labor is required to form embankments and excavations of given dimensions, and fortify them, if it be possible, against external influences, so that both may not again be speedily obliterated or rendered comparatively useless by the winds of Heaven.

It remains also to be ascertained what plan of construction is the best for the track and for the buildings and other appendages of the road. Whether timber, under its necessarily great cost, can be used with propriety to any extent instead of stone or metal, in forming the track, and for other purposes, and if so used, will be sufficiently secure from destruction by fire in those arid wastes, or whether in the absence of the *bois de vache* or "buffalo chips," which will become very scarce in the immediate vicinity of the railroad, the Indian, (still the principal tenant of that uninhabitable region,) will hesitate to obtain from the material of the road the means to cook his hasty meal, or warm, in winter, his shivering limbs.

It remains also to be ascertained, whatever plan of construction may be adopted, what is the actual cost of labor, of materials, and of provisions, etc., under the great and extraordinary inconveniences and disadvantages which will necessarily surround and encumber the execution of the work. And should it finally be completed, it remains to be seen what will be the actual cost of operating and maintaining under the great disadvantages which must forever exist, and to appreciate which, the past history of railroads affords no antecedents, or any evidence upon which a correct judgment can be formed, further than the certain assurance of the cost exceeding greatly the limits of all past experience.

This is the true aspect necessarily presented by the subject when the question of cost of either of the three routes named is seriously considered, and cannot be changed unless it shall appear that whatever has been written of the country is untrue, or the facts have been greatly exaggerated and distorted, or unless, what is about equally probable, Providence shall interpose and remove that great barrier, the Cordilleras of California, and compel, also, the trade winds to distribute their treasures in a less partial manner over the entire region from the Pacific to the Rocky Mountains.

On the subject of cost, therefore, the only conclusion at which it is at present possible to arrive, is, that all things considered, including difference in climate and other circumstances named, either of the three southern routes must cost very much more, mile for mile to build, than the northern, and will cost, also, very much more to operate and maintain; and in arriving at this conclusion it is not forgotten that the northern route has also its difficulties, some of which are of a serious character. That on portions of it there is a scarcity of timber, and that the conveyance of materials, etc., on much of the line, will be attended with unusual expense; but aside from these the work possesses no extraordinary character, and there is no good reason to suppose that it can very much, if any, exceed the limits of an estimate as liberal as the one herein presented. The country through which this line passes, is, in general, susceptible of improvement, and will be settled, probably, about as fast as the road can be built; a circumstance which, while it will contribute greatly to the business of the road, will add to its security, and materially lessen the expense of operating and maintaining it.

That this is a just conclusion is evident from the fact, that even now the tide of emigration and settlement is setting more strongly in that direction than any other, under the combined attraction of soil and climate; and this movement will be greatly accelerated whenever the line of railroad is completed, as it soon will be, direct from Chicago to the Mississippi, and more especially when it is known that a railway is to be constructed upon the proposed Northern route to the Pacific.

It has been stated that the portion of the most southern route, from the Mississippi to the Del Norte, passes through a region of country possessing many attractions for settlers, a region which will *in time* undoubtedly fully justify the construction of a railroad for its accommodation.

This remark applies more particularly to the portion from the Mississippi to about Long. 101° or 102° W. From thence to the Rio Del Norte there is no timber except a little in the vicinity of the Pecos river. Water in this district is also scarce, and the soil is of an inferior character.

West of the Del Norte the country has few attractions of an agricultural character, but the mountains and the valleys on either side of the Gila are said to be rich in minerals and in the precious metals. To obtain suitable access to them and to fulfil in a proper manner our treaty relations with Mexico, a railway to the valley of the Del Norte is important; but beyond this it is difficult to perceive any present necessity, or advantage commensurate with the expense, for such an improvement, a conclusion in which our readers will more readily acquiesce when they come to see from the remarks which follow, the degree of interest the State of California really has in such an improvement.

The immediate valley of the Gila is considered by all acquainted with it, as impracticable for a railroad, so that whatever may be the determination in respect to the Mexican boundary, it will be necessary to locate the road for some distance on Mexican ground, and the connexion with the Gulf of California must also be made in Mexican territory.

With respect to the other lines projected from the Mississippi or Missouri rivers towards the Colorado Valley, they will, if judiciously located, and extended so as to keep a proper pace with the movement of the population, be well sustained in their course to the Rocky Mountains, but beyond these no inducements exist for their extension, or are likely to exist for many years to come; unless at a few points where there are very favorable passes, it shall be found expedient to enter the borders merely of the immense waste which lies beyond.

Under an enlarged commercial view of the subject the more populous of the States lying to the east of the Mississippi, have very little interest comparatively in the adoption of any central or more southern route from that river to the Pacific.

To illustrate the truth of this latter position let it be assumed, that San Francisco is a point on the Pacific as desirable to be reached as the Straits of De Fuca,—that its distance from St. Louis for instance by any practicable route is no greater than the distance of De Fuca from Chicago,—that the cost of constructing and maintaining and operating a railroad upon the former route is no greater than upon the latter, with no more elevation to be overcome—that the country through which the former passes is equally productive with the latter, and will afford a revenue from a way business in time equally great, (all which assumptions are untrue,) what then would be the aspect which the question would present, and which of the points St. Louis or Chicago would be the most convenient and easy of access by the mass of the population between the Mississippi and the Atlantic?

The question is very easily answered by a reference to the map, and drawing thereon a straight line connecting the two cities of

St. Louis and Chicago, and from a point midway on this line drawing another as AB (see map) in a south easterly direction perpendicular to it, which it will be seen meets the Atlantic in the vicinity of Wilmington, N. C. Any point in this latter line is evidently equidistant from St. Louis or Chicago and hence all places to the north of it, must be nearer to Chicago than to St. Louis.

The portion of the population of the United States which is thus situated nearest to Chicago comprises two-thirds of the whole.—That section of the Union also includes much the greatest portion of the capital of the country, and at least seven-eighths of its commercial and manufacturing interest; branches of national industry which will contribute most to the business of the road when built.

If the mouth of the Kanzas River is assumed as the eastern terminus of the proposed central road, the distance from it to San Francisco, will probably be found as great as from Chicago to De Fuca, the latter route still possessing all the other important points of superiority, enumerated above. Indeed if a point be taken far enough west on the route from St. Louis to San Francisco, to place that route on a par with the Northern route, in respect to distance, gradients, expense of constructing and operating combined, to say nothing of the inferiority of San Francisco, as a terminus compared with De Fuca; and if from that point a direct line be drawn to Chicago, as is done upon the map from St Louis to Chicago, and this line be bisected by another at right angles to it drawn to the Gulf of Mexico, it will be seen that, as between the two routes named, nearly every State east of the Mississippi is nearest to the Pacific by the Northern route.—In fine, if the States east of the Mississippi were expunged and St. Louis stood the acknowledged best point for the eastern terminus of the proposed road, the very best route that could be selected from it to the Pacific, would be the northern route.

Chicago is not only situated the nearest to the most populous and most commercial and manufacturing portion of the Union, and also to the Canadas, which will contribute largely to the proposed road, but it has the great advantage of a position at the extreme limit of navigation of the Great Lakes, a navigation which is so much cheaper than the cheapest conveyance by railroad, as to attract by a force which cannot be resisted most of the freight passing between New York and the Pacific, over any route leading from St. Louis, so that in comparing the Northern with the St. Louis route it would be the most correct to assume the latter as terminating at Chicago, in which case the disparity between the two in favor of the Northern route will be still more apparent.

This view of the subject exhibits in a striking manner the great difference between the two routes, and presents in a strong and clear light the superiority of the Northern route as compared with any more southerly route proceeding from St. Louis to the Pacific.

St. Louis has not only not the advantage in position in its relation to the leading cities of the Atlantic as Chicago, but any route passing from it to the West has no such invaluable feature as is possessed by the Northern route, in the opportunity it affords for a connection with the navigation of the Lakes, by the branch to Lake Superior, which reduces the distance by railroad between that navigation and the Pacific to about 1600 miles, being somewhat less probably than the distance from Memphis or New Orleans to the Gulf of California; neither can it command in so great a degree the European trade and intercourse with Asia across the continent, which must constitute a large portion of the business of the Northern route, and add greatly to its revenue; a trade which will yield larger profits upon the Northern route, just in proportion as the expense of carrying upon that route is less, in consequence of the less cost, and less expense of operating and maintaining it, as compared with the more southern routes.

The attention of the English government and of English capitalists is already seriously directed to the subject of a communication by railroad across the continent from the Great Lakes, and should the Northern route not be built, a road designed to accomplish the same object will undoubtedly at no very distant day be attempted within the British possessions, on ground, which although not by any means as favorable as is to be found within our own borders, is still sufficiently favorable to render a road constructed upon it superior, in many respects, probably, to any of the more southern routes, and upon which if a road is built it will command somewhat more than the *Lion's* share of the Pacific trade.

Such is the great advantage in position of the Northern route as a commercial thoroughfare, such the character of the country through which it passes, connecting as it does by the best route the most important points on the Atlantic and Pacific, and touching in its course the most populous and growing portion of the Mississippi and St. Lawrence valleys, that if either of the proposed lines to the south of it were previously constructed by Government aid, the force of circumstances and private enterprise would in time cause it to be built, even if our English neighbors should attempt a similar communication; and when built it would become the leading channel of communication between the two oceans.

It has been stated that neither of the routes proposed leading from San Francisco to the Mississippi, could, if built, command the entire trade and travel between the Bay of San Francisco and the Atlantic. Transportation by sea being very much less expensive than by Railroad, the routes by the Isthmus notwithstanding the greater distance, will doubtless continne to participate largely in the trade between the points named. This will be especially the case when the construction of the canal connecting the two oceans is accomplished, a work which if it proves as feasible as represented, is deserving of more consideration than any other of the Isthmus projects, and will, in all probability, take from threm whatever of interest the North American States might otherwise have in their construction.

The Isthmus routes must always be formidable rivals to any line of Railroad leading from any of the Southern Ports on our Pacific coast to the Mississippi river, and thence to the Atlantic; and hence true policy dictates the adoption of the most northerly route practicable for the proposed Road, consistent with other considerations of importance;—considerations which are all fortunately with scarcely an exception, in favor of the Northern route.

The character of the Road as affording the most profitable investment for capital, should not be lost sight of in its location. Whether constructed by private means or in part or wholly at Government expense, the principle of so locating it as to secure the largest returns from the capital invested cannot with propriety be overlooked.

Such are the physical characteristics and probable future commercial relations between the several portions of our country on the Pacific, that a communication by Railway connecting California with Oregon and Washington will be found indispensable. Upon the map of Senator Gwinn, already alluded to, a line is projected extending from the Bay of San Francisco to Puget Sound, and it is understood that a grant of lands will be solicited from Congress for its accomplishment.

If a practicable passage can be found from the upper part of the valley of the Sacramento to that of the Willamette or of the Fall River, it cannot be long before it will be occupied for the purposes of a Railroad; and when so occupied a communication will be at once opened, by which the population of California will be able to avail themselves of the great facilities afforded by the Northern route for communicating with the eastern States of the Union.

The ground at the northernmost sources of the Sacramento is undoubtedly quite elevated, but it can scarcely be so high as to make the entire rise and fall from the Sacramento valley to Lake Superior or Lake Michigan, equal to what it is by either of the southern routes to the Mississippi. Col. Fremont, who passed up the valley of Fall River, describes it as having a rich soil covered with noble forests. He found the elevation where he left it near its source 4,000 feet above the sea Between the sources of the Fall River and the Sacramento are interposed those of the Klamath which flows in to the Pacific a little north of Humboldt harbor.

A road extending from the Sacramento valley, which is the most populous and productive portion of California, and carried from thence along the valley of Fall river and across the high prairie plains east of the Columbia to the valley of Clark's river, will connect with the Northern route at a point which will make the distance by railway from the Bay of San Francisco to Lake Superior about 2,300 miles; a distance no greater probably, than by either of the proposed Southern lines from San Francisco to the Mississippi, and possessing in comparison with the latter many and great advantages.

If instead of a railroad communication between the Bay of San Francisco, and Oregon and Washington, reliance is placed on the communication by water with the Ports of the latter, the Northern route will probably still prove the best and most eligible of the inland routes from that Bay to the Atlantic States.

The distance from San Francisco to the mouth of the Columbia by water is abut 600 miles, and from the latter to Lake Superior, as estimated, is 1750 miles, or 2350 miles in all. This is very little more than the distance from San Francisco to St. Louis, and less than from San Francisco to Chicago by the St. Louis route. The former is very much the cheaper route of the two for transportation. Only 1750 miles of railroad conveyance to Lake Superior, the remainder being ocean navigation, and 2110 miles only to Chicago; while from San Francisco to Chicago the entire distance by railroad is not less than 2430 miles; nearly 700 miles more than to the west end of Lake Superior, a point as near to the Atlantic by the unrivalled navigation of the Lakes as is Chicago.

From the Bay of San Francisco to Chicago the distance by railroad as estimated by the Northern route is 2560 miles. This is 130 miles more than the estimate between the same points by the way of St. Louis. If, instead of the Bay of San Francisco, a point to the north of it in the Sacramento valley is selected, nearer to the centre of population of California, the distance will be very nearly the same as on the two lines to Memphis and St Louis, but the Northern route will have in respect to the latter this decided advantage.

It passes through in its entire extent, a country susceptible of improvement and settlement, and will consequently transact relatively a larger way business.

For 1300 to 1700 miles of the distance it forms a part of what must be by the immutable laws of cause and effect, the great commercial inland route of the continent, the highway between the Northern Atlantic and Pacific, a thoroughfare such, probably, as the world has never witnessed, transporting annually its hundreds of thousands of passengers and a vast amount of freight

This being its character and the expense of transportation by any medium of intercommunication being invariably *less*, as the amount of business to be done is *greater*, it follows, that the cost of transport by this route from San Francisco to Lake Superior or to Chicago will be less than it can be on any other route from the same point to the Mississippi. Add to this the greater cheapness of transportation during the season of navigation from Lake Superior to the leading cities on the Atlantic, compared with that from the Mississippi to the same points, and it gives to the Northern route as a means of communication between California, and the older States of the Union east of the Mountains, a character which cannot be surpassed by any other inland route, from the Bay of San Francisco to the Mississippi.

The cost of transportation will not only be less upon the Northern route in consequence of the greater amount of business done upon it, but it will be a cheaper road to operate and to maintain, and so much cheaper as to lessen materially the charge for transportation, if those charges on the several routes are made with reference to a fair remuneration for the expenses incurred and capital invested. This follows from its having, in general, easier gradients, a much less amount of elevation to overcome, in the aggregate, on the main line from the lakes to the Pacific; the cost of fuel, provisions and materials, for repairs of road and engines will be less, and all other expenses incident to the operation and mainteinance of the road will also be less.

It will not only be the cheapest inland route for transport between the States east of the Rocky Mountains and the Pacific, but it will be the most expeditious route for travel. The easier gradients, and less elevation, and the more complete and efficient equipment upon a road doing a large business, will enable it to maintain a higher speed, and it will be subject to fewer contingencies in respect to the regularity of movement of its trains, and it will be less liable to interruptions from snows, and floods, and drifting sands and other causes, than the more southern routes.

Irrespective of a connection with the Northern route and a communication by means of it with the Atlantic States, the population of California have a deep interest in securing, if practicable, a line of railroad direct from the Sacramento valley to Oregon and Washington. Such a road will give to them direct access to the timber and agricultural regions of the latter, and in a military view, will give to them the means of defence, which cannot be so well or efficiently obtained in any other way. The population which is gathering on the Pacific coast, and is rapidly increasing in numbers is, even at this time, probably, sufficiently numerous to resist any hostile force which can be brought to bear upon it by sea. All that is required is a line of interior communication by railroad, and telegraph, parallel with the seaboard, by means of which the forces of the country can easily and quickly be transported to the exposed points, which are few in number, and the erection at proper points of a few marine and floating batteries, and the establishment, also, at convenient points of depots containing arms and munitions of war. By adopting this course, California, while securing for itself what will conduce most to its advantage in a military view, is at the same time, doing that which will contribute also most to its advantage commercially, in securing a direct connection with the territories, north, and with the best inland route to the leading States and cities on the Atlantic.

GENERAL REMARKS.

In consequence of the imperfection of the data from which the elevations of all that portion of the proposed Northern route lying between the *Hauteurs des terres* of the Mississippi and the Columbia were obtained, it would be singular if they should not be found somewhat at variance with the results which will ere long be furnished by the surveys now in progress.

By far the greater portion of the route which is thus uncertain, is situated in the immediate vicinity of the Upper Missouri and Clark rivers. Any error which may be found in the estimated elevations of this portion cannot, it is conceived, be so great as to affect appreciably the general character of the route.

In forming an opinion of the ascent of the Missouri valley from Fort Pierre, and of the elevation of the main summit, reliance is necessarily placed mainly upon information derived from the Journal of Lewis and Clark. This Journal was not published until after the death of the former, and did not receive from him the corrections and amendments which would probably have been made on a final revision for the press. It is, nevertheless, written with a great degree of particularity, as will be evident from the extracts made, and carries with it internal evidence of truthfulness rarely met with in productions of a like character.

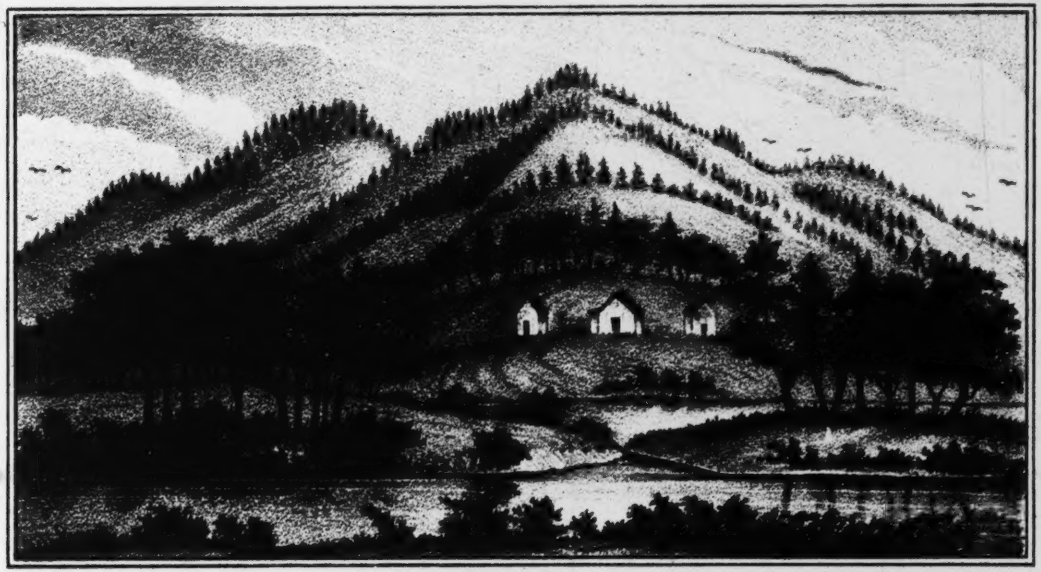
The Journal was published with an introduction from the pen of President Jefferson whose private secretary Capt. Lewis had been. He says of Capt. Lewis, that he was a man "habituated to exact observation, honest, disinterested, liberal, of sound understanding, and a fidelity to truth so scrupulous that whatever he should report would be as certain as if seen by ourselves."

The justice of this flattering testimonial is confirmed by M. Nicolet, who alludes to the "truth, accuracy, and conciseness" of the descriptions contained in the Journal; descriptions which in his "judgment and experience will serve for comparisons useful to geography. They will even come, hereafter, to be useful for the physical history of the mighty Missouri, the effects of which in the valley it passes through, serve as a standard in investigating the regime of larger rivers, and in perfecting the hydrographic theory of their flow."

The correctness of the elevation of the Missouri river at the head of the Falls, where it approaches near to the main summit, depends very materially upon the accuracy of the barometrical measurement of M. Nicolet at Fort Pierre. Such measurements, when made with suitable instruments by competent observers, can usually be relied upon as near approximations to the truth. The very high reputation of M. Nicolet is a guarantee of the greatest value in respect to the correctness of the measurement in question.

From Medicine river to Clark's river, including the passage of the main summit of the Rocky Mountains, the assumed elevations are not as reliable as on other parts of the route, particularly in respect to the elevation of the main summit, which is estimated to be 5,000 feet above the level of the sea: The evidence upon which this opinion is based, will permit of a lower estimate even than that, while the actual elevation may be greater; but it is believed that it cannot be so much greater as to impair materially the correctness of the conclusions arrived at, in regard to the general character of the Northern route as compared with others.

The actual elevation of this summit, whether its height be a thousand feet more or less than the estimate, is not of so much importance in the comparison as its feasibility at all seasons, particularly for the purpose of a railroad; a fact which must be considered as fully



ST. IGNATIUS, KALISPEL BAY CLARK'S RIVER.
From De Smets Oregon Missions.

demonstrated, and which the explorations now being made will undoubtedly fully confirm.

The estimated elevation of this main summit is more than 3,000 feet less than that of the highest or Bear Mountain summit on the emigrant route to Oregon by the South Pass, as measured by Col. Fremont; and is 2,500 feet less than that of the South Pass, or of any other practicable summit probably north of the latitude of the Gila. This very moderate elevation of the main Rocky Mountain Range at the sources of the Missouri is certainly remarkable, and would not be believed if the evidence in its favor was not very strong and conclusive.

In respect to the estimate of distances upon the several routes, the object has been to exhibit their *relative* rather than their *absolute* lengths.

The mode adopted for doing this by ascertaining the direct distance upon each, and adding thereto such a per centage as seemed proper in each case, is believed to be the best that could have been pursued. The amount of that percentage for the Northern route was intended to be more liberal than upon the others, considering its character. It is probably too small upon all of the routes, but as the results are greater upon the more southerly routes than has been usually given by their advocates, and as the main object is to know nearly their relative lengths, whether the per centage added is too little or too great is not of so much consequence.

The distances obtained by the surveys now in progress, will exceed, probably, the actual distances, when the latter come to be known. This follows from the mode of making the measurements with the odometer, and also from the indirectness of the lines measured. The same plan, however, being pursued upon all of the routes, their relative lengths will doubtless be obtained with a sufficient degree of accuracy.

The point which will be the most difficult of attainment, is an estimate which shall be satisfactory, of the cost of constructing and operating the roads upon the several routes. Upon the Northern route, as already explained, the data for such an estimate are much more certain and reliable than upon either of the other routes.

Those who are at all conversant with such subjects will not consider the estimate of $100,000,000 for that route, including the branch to Lake Superior, as too high. The cost upon the other routes must greatly exceed this, and so much exceed it, if the estimates are justly and properly made, that when their inferiority in other respects is considered, although they may be undertaken for that object, the most of them will be abandoned as through routes to the Pacific, until such time as the interests or necessities of the country shall justify the putting so large an amount of the capital of the country into more than one route.

In the practical execution of a work of so great magnitude there will necessarily be obstacles and difficulties of a serious nature to be overcome, even upon the route which is the most favorable. Upon the Northern route these will be much less formidable than upon either of the others, and if the spare capital of the country can be concentrated upon it, may be accomplished in a short time without injuriously affecting other interests of equal importance.

It will be well if but one route is attempted at first, and that the best one; the others to be accomplished hereafter as occasion shall arise for their use. The country has no capital to waste upon unproductive schemes, and none to bestow upon those which do not promise the most beneficial results. A project which requires so great an amount of human labor for its execution, and which must involve the fortunes of so many, should not be entered upon without a most thorough and careful investigation into its merits

The Northern route can, with such aid as may with propriety be granted by the General Government, besides costing less, be built in less time than any other route, owing to the superior facilities it possesses for the purpose.

From the west line of Wisconsin to the Pacific the distance as estimated is 1600 miles. This is not a greater number of miles of railroad than has been in progress in the single State of Illinois within the last three years There is nothing therefore in the magnitude of the undertaking which should be urged as a reason for not attempting it at the present time.

Owing to the unsettled condition of most of the country through which it will pass, and the difficulty of access, the progress of the work will necessarily be slow, and if commenced at once, cannot be completed before the entire road will be absolutely needed to meet the wants of the government and of the people.

The aid which is anticipated from government, and which is necessary to accomplish the work, will consist probably in a grant of lands similar to the grants already made in aid of the construction of railroads in Illinois and other States.

These grants thus far, have been made to the States, and by them given to the companies building the roads. They embrace every alternate section for six miles in width on each side of the line of the roads, and where the sections designated are occupied or have been entered within that distance, the privilege is given of making up the given amount by taking land within a distance not exceeding fifteen miles from the lines of the roads.

In respect to the portion of the Northern route to the Pacific lying in Wisconsin, a grant of this description will enable the company holding the charter in that State to carry the line rapidly on to the western boundary of the State. West of Wisconsin, through Minnesota and the country west to the Pacific, a belt of land of greater width will be required.

Throughout all this portion, it is perhaps needless to say that a grant of lands to be adequate for the purpose must be very liberal in amount. However well adapted the country may be for settlement and improvement between the *Haut terres* of Minnesota and the mountains, it cannot be denied that the prevailing impressions in respect to it are not the most favorable. These must be removed. Much of the surface near the line of the road may be found of inferior character, and, in the mountain portion particularly, may be entirely unsuited for cultivation or improvement in any way. This being the case, the company, to induce an early settlement, must make liberal donations to actual settlers.

It is easy to perceive, therefore, that the grant from the government must be a liberal one, to enable the company or companies that may be the recipient of it, to accomplish the great object in view within the time required by the wants of the country in regard to it. With such a grant a railroad can be built on the Northern route to the Pacific and maintained until such time as the business upon it shall become sufficient for the purpose. It is a question worthy of the most serious consideration of all concerned, whether a like result can be attained on *any* of the more southerly routes.

This doubt is not expressed from any feelings of sectional jealousy or hostility to either of those routes, but from a firm conviction that there are physical difficulties and obstacles to be encountered upon them of a magnitude transcending greatly any estimate that has been hitherto put upon them by their respective friends and advocates.

As a preliminary step to the construction of the Northern railroad to the Pacific that route should, without delay, be opened for use by the government to emigrants going to the territories of Washington and Oregon. A comparatively small expenditure will render this the very best inland route, not only to those territories but to California. A good wagon road should at once be formed from the Falls of the Missouri to Clark's river. Another from St. Ignatius on the latter river to the Chaudiere Falls on the Columbia. With these improvements, embracing perhaps three hundred miles in all, a way will be opened the entire distance from the Mississippi to the Dalles of the Columbia, on the most of which at the proper season there exists a very good navigation, forming the cheapest and very best route for emigrants to pursue.

This route once properly opened and protected by the government, would immediately be occupied for travel. Settlements would be made upon it; the valleys of the Upper Missouri and Clark's river would soon be dotted with towns and villages, and the way would thus be paved for the easy and successful construction of the railroad.

On the subject of the revenue to be derived from the road no remarks have been made. The railway system has been in operation long enough to afford ample evidence of the productiveness of all lines connecting important business points. Those which are entitled to be ranked as main lines, connecting the great centers of population and business, are, without exception, wherever they are under good management, yielding large profits to their owners, and under the growing condition of the country must prove more profitable for the future than they have been for the past.

The proposed railroad to the Pacific will hold no inferior or secondary place in the great system which is gradually spreading over all the habitable portions of the continent. Occupying, as it will, the very best ground for an inland route between the two Oceans, it must, if well and properly built and managed, transact an immense business; and under the aid contemplated from Government will, *in time*, yield liberal returns to its owners. Returns which will eventually abundantly repay those who may be induced to invest their means in its construction; but however great a thoroughfare it may eventually prove, its friends must not be too sanguine, or anticipate too soon, that which it will require time to mature and accomplish. It is important to its security and success that there should be a population of a certain amount collected in its vicinity. Some years must necessarily be occupied in its construction, and the commerce and travel of this continent and of the world must have time to adapt itself to this new channel of communication.

Notwithstanding the very favorable character of the Northern route, as exhibited in the preceding pages, it is perhaps not surprising that it has not hitherto received the attention it deserved. The Journal of Lewis and Clark, with the exception of an abridged edition for the "Family Library," has never been republished. The lapse of 40 years has served to obliterate the impressions at first produced, and many without due discrimination may have risen from its perusal, supposing that the trials encountered by them in the snows were experienced, if not in passing the main range of the Rocky Mountains, at some other place which could not be avoided.

It is known to the writer that at least one author of note has fallen into this error.

These considerations combined with the recent events of the Mexican war, the discovery of gold in California, and the inland trade which has for some time been carried on with New Mexico, has served to direct public attention to the practicability of reaching the Pacific by a more southern route, to the almost total neglect of the one which it is believed will eventually prove to be the best, and, (it may be said with truth,) the only one which offers a reasonable prospect of success. The principal objection which can be raised against it is the character of the climate from its northern position, and its nearness to the national boundary, objections which so far as they relate to the climate and obstructions from snows have been, it is believed, satisfactorily removed; and so far as they relate to its nearness to the national boundary are entitled to no weight, so long as the road connects and accommodates in the best manner the eastern and western and central portions of the Union, and is in the best position also for accommodating the Asiatic trade.

This nearness to the British possessions when rightly viewed becomes a favorable feature rather than otherwise, and may be fraught with much mutual benefit to the two great Nations whose territories, spanning the continent, are contiguous for so many hundreds of miles. North of the Great Lakes, and of the latitude of 49° to the Pacific, the country, although it may be practicable for a Railway, can give but a limited support, comparatively, to such an improvement, and the road itself, should one be constructed, would be forced to occupy ground much less favorable for the cheap construction and efficient operation of such an improvement, than is found upon the proposed Northern route within the limits of the United States.

A Railway communication across the continent is necessary to

Great Britain as a means of access to her Canadian possessions, and in reference also to the great interest she now has and must continue to have in the commerce of the Pacific, and, as if fully conscious of this necessity, she is now busily occupied in constructing lines of Railway along the valley of the St. Lawrence, and from the borders of Canada and Maine through New Brunswick, to such point as will make the navigable distance across the Atlantic the least possible. These lines are now also being rapidly extended back into the interior, and will soon reach the shores of Lake Huron and those of Lake Superior.

The improvements thus being made in the Canadas will serve to increase the tide of immigration, which is now very great, causing it to move westward with accumulated force, in the direction of the Great Lakes, and of the most favorable opening through the mountains to the Pacific.

Tne United States have probably a deeper interest in these changes and improvements than the people of England or those of any other country in the world. No other country is so well situated as the United States for drawing wealth from the two great Oceans which encircle the Globe, and for carrying on a profitable intercourse with the civilized and industrial nations that are seated on their shores, and none where the people as a mass are so intelligent, and where the encouragement to industry and enterprise, derived from just laws, is so great.

Holding this position, the command of the best route across the continent is of the utmost importance, and it is of equal importance that it should terminate at the most eligible point on the Pacific.—Both of these conditions are answered by the Northern route.—The distance by it from New York city to the Straits of De Fuca, is 3,000 miles, estimating by the shortest railroad route from New York to Chicago.—At the mean rate of 30 miles an hour, it will occupy four days continuous travelling, to pass from Ocean to Ocean.—At 50 miles and upwards per hour, which is not an unreasonable speed for a fast train on the broad gauge, and allowing 14 hours for detentions, it will be only three days from Ocean to

Ocean. Supposing 300 miles per day, for Ocean Steamers, a distance which vessels of that description are now capable of performing, and the time required to pass from New York city to China will not exceed 24 days and 21 days only to Jeddo, the capital of Japan.

A communication of this character must produce a very great change in the commercial relations of the countries that are thus brought so near to each other, and this change will be the greater for the reason that there now exists a very wide difference in the productions of each, and in the value of labor and of property. It will give a new and powerful impulse to commerce; immigration from Europe will be increased, and Asia will contribute to swell the population on the Pacific; and the natives of that hitherto far-off land, may perhaps in a few years be found in no inconsiderable numbers cultivating the cotton and rice-fields of the more southern States of the Union.

When the first census of the United States was taken in

		Ratio of increase per cent.
1790, the population was	3,924,544	
1800 " " "	5,305,941	35.1
1810 " " "	7,223,889	36.1
1820 " " "	9,643,211	33.4
1830 " " "	12,867,511	33.4
1840 " " "	17,064,688	32.6
1850 " " "	23,351,207	36.8
Mean,		34.57

By this statement it appears that the mean decennial increase in the population for 60 years is 34 57-100 per cent, and that this increase has been very regular, the ratio at the several periods when the enumeration was made not differing at any time from this more than 2 1-4 per cent, the greatest increase being 36 8-10 per cent from 1840 to 1850.

Assuming this mean rate of increase to continue for the next thirty years and the population will then be 57 millions, and for fifty years it will be over one hundred millions. It will not be proper perhaps, to assume so great an increase for so long a period as the last. Immigration from Europe which has furnished a large portion of the decennial increment must diminish whenever labor shall receive the same reward there as here, and the political institutions of that portion of the world are made to conform theoretically and practically as near to the Christian standard as our own. This falling off in the immigration from the East, which must in time take place, will probably be compensated for by accessions from the West. So that for thirty years at least, it may reasonably be supposed that the rate of increase hitherto maintained will continue, and that it will not be greatly diminished until some time after that period. In the above estimate our territorial limits are supposed to continue unchanged.

From what is known of the capabilities of the several portions of the territory now embraced within the limits of the United States to sustain a given population, combined with the attractions they offer for improvement and settlement, it is not difficult to see where the larger portion of the thirty or forty millions of increase in that period will be located.

East of the Rocky Mountains, it will be found mostly in the northern and middle States, and in that vast and fertile region, stretching northward and westward from the mouth of the Ohio, the entire distance to the Lakes and the mountains, covering the whole extent of the Missouri valley. West of the Rocky Mountains the bulk of the population will be found north of the Bay of San Francisco, in Northern California, Oregon and Washington.

In 1790 when the first census was taken, the centre of population of the United States, was not far from the head of Chesapeake Bay. The population East and West and North and South of that point, was at that time the same. The subsequent increase has caused this central point to move westward and northward, until it reached Pittsburg in Pennsylvania. From thence its path has inclined a little to the south and at the last census its location was not far from Steubenville, in Ohio.

It is quite evident from an inspection of the map that its course henceforth will, for a time, be nearly due west, after which it will incline rather to the north, passing nearer to Chicago than to St. Louis, and may ultimately be found in the vicinity of the Mississippi, beyond which it is not probable it will ever pass.

The line thus described marks the westward movement of the population in respect to numbers solely. A similar line drawn so as to represent not only the population numerically, but the capacity of the several portions to produce exchangable wealth, would lie still farther to the North. The productiveness of the Eastern and Northern States is vastly increased relatively by the greater amount of steam and hydraulic power and greater number of labor saving machines in use in the arts, whether operating on the land or on the water. This condition of things gives to that portion of the Union an importance commercially, far beyond what is due to any numerical estimate of the population.

It will be seen from the above that whether we view the proposed Northern route for the Pacific railroad in respect to the region through which it passes near its two extremities, or midway between the latter, throughout its entire length, it occupies the best position for accommodating the great mass of the population of the Union both at the present time and for an indefinite period after it shall be completed and in operation.

In a commercial view in tracing the path of the centre of population of the United States it would have been proper to have included that of the British Possessions adjacent. This would have carried it still farther to the North, passing ultimately nearer the Southern extremity of Lake Michigan and making more evident the superiority in position of the Northern route.

The Canadas are now advancing rapidly in population and wealth. The ratio of increase in the population of Canada West within the last ten years has been much greater than in the adjacent States of the Union in the same period. The population of both in January, 1852, was 1,842,205. In the whole of British North America it now amounts probably to about three millions.

English capital is being freely expended in carrying out a system of internal improvements and extending the advantages of improved communications to all the settled portions of British North America. The lines of railroad now completed and in progress amount in the aggregate to about 1200 miles, involving an expenditure of over fifty millions of dollars, all of which will become directly tributary to the Northern route to the Pacific.

Owing to the great diversity in the productions of the two countries, the commercial relations between the Canadas and the United States must be constantly growing stronger, until their interests shall be so identified, aided by a common language and origin and the attractions of a free government, as not to be separated by any transatlantic influence. Great Britain profiting by past experience is disposed to yield to her Canadian Possessions a large measure of freedom. These concessions must continue, and to such an extent, that in time, the Canadas will virtually if not nominally be rendered independent of the mother country, and thus a more complete identity of interest and of feeling will exist between them and the free States of America, than can possibly be maintained with any European power.

While these events are ripening the Canadas will be acquiring population and wealth. Numerous flourishing towns and cities will spring up on the northern shores of the St. Lawrence and the Lakes, and they will contribute a vast amount of travel and business to the proposed Northern road to the Pacific; add to this the peculiar advantageous position of the proposed road, affording the most direct, speedy and cheap communication between Europe, with its millions of inhabitants on the one side, and Asia still more populous on the other, and the project assumes an importance transcending any estimate which may have been put upon it as a National work. It becomes in fact the *World's Highway*, over which will pass the travel and much of the trade of the most enlightened and civilized portions of the globe.

SUPPLEMENT

TO SECOND EDITION.

When the first edition of the preceding was prepared for the Press, or for publication in the Railroad Journal, no returns had been received from the surveys then but recently instituted by the General Government for exploring the several contemplated routes to the Pacific.

Intelligence has since been received from the several parties engaged in these surveys, and also from other sources, giving partial information in respect to particular and prominent points on each of the routes; all serving, to confirm very fully and satisfactorily the correctness of the descriptions and conclusions arrived at in regard to their general character.

Upon the Northern route Lieut. R Saxton who had been dispatched from the Pacific with supplies, fortunately met Gov. Stevens and party at the Falls of the Missouri. The former in passing the mountains, made a measurement of the elevation of the main summit, the result of which has been given to the public in a communication from Gov. Stevens, who says, that " Lieut. Saxton reports Cadots (Lewis ?) Pass to be some 2,500 feet lower than the South Pass."

The South Pass, by the first measurement of Col. Fremont, was ascertained to be not far from 7,000 feet above the sea. A second measurement by the same gentleman, which was considered the most accurate, gave 7,490 feet Deducting from this 2,500 feet leaves 4,990 feet.

It is now understood that the measurement of the main summit by Lieut. Saxton gave for its elevation 4,674 feet only above the sea. The barometer (an aneroid) used by him is supposed to be more liable to error than any other, and with any instrument of the kind the greatest care and frequent repetition of the observations are necessary to ensure a proper degree of accuracy in the results, both of which are inconsistent with a hurried march for a long distance over a difficult country, such as Lieut. Saxton was compelled to make.

Until, therefore, further information is received, it would not be safe, to place the elevation of the main summit lower than has been assumed in the preceding estimate of 5,000 feet above the level of the sea. (See page 32.) That it cannot much, exceed this, seems now to be fully demonstrated, and those who have doubted the superior character of the Northern route from apprehensions of a much greater elevation of the Pass through the mountains will now have their doubts removed.

The correctness of the estimated elevation of the country between the Mississippi and the mountains is also very fully confirmed.

Gov. Stevens states that the elevation of the mouth of the Yellow Stone is 1,100 to 1,200 feet above Fort Snelling at the Mouth of the St Peters on the Mississippi. Nicolet makes the level of the plateau on which Fort Snelling stands, 850 feet above the Gulf of Mexico. This gives for the elevation of the mouth of the Yellow Stone 2,000 feet nearly, above the same level. The estimate previously made of this point is 2,040 feet as will be seen by reference to page 22.

Mr. I. Doty, a member of Gov. Stevens' party, in a letter recently published, says that "the summit level between the Missouri and Mississippi is 1,200 feet." Whether this is to be understood as refering to Fort Snelling as a base or to the place of departure of the Survey from the Mississippi, viz, the Sauk Rapids, is not stated. If the latter, it gives for the elevation of the highest part of the Coteau du Missouri 2,200 feet. If the former, about 2,150 feet, both being less than the estimate previously made which was 2,300 feet. (See page 20)

In respect to the actual elevation of the crossing of Red River no information has yet been received, but the known height of Lake Winnepeg (853 feet, see page 19,) and good navigable character of the river, the head of navigation being in lat. 46¼° N. where the proposed route crosses it, renders it quite certain that the estimated elevation of that crossing is not very wide of the truth.

The elevation of the ground at the *Hauteurs des terres*, is known as already stated from Nicolet's measurements, and is about 1,700 feet above the sea.

West of the mountains the elevation of the surface, in the valley of the Columbia, was given from what was deemed very good authority. The measurements of Lieut. Saxton, indicate a somewhat lower elevation for this portion. The difference, if it exists, is still more favorable to the general character of the route

A letter from Portland, Oregon, dated Nov. 24, 1853, states that the parties engaged in the surveys, have just arrived, and report "the whole line of the route feasible for the great Pacific Railroad, having found two Passes through the Rocky Mountains, and two through the Cascade Range, making it practicable to the magnificent waters of Puget Sound." * * "No fears are entertained by the party, as to the obstruction of the Road on account of the snows on the mountains."

The preceding is confirmed by the following from Gov. Stevens under date of Olympia, W. T., Dec. 5, 1853: "After a long and arduous journey across the country, my party has at length reached Fort Vancouver in good health and spirits, having made a thorough survey of the route, and being convinced of its entire practicability. Our success has been greater than we anticipated. The country throughout is well wooded and watered, and admirably adapted to settlement and cultivation. It furnishes inexhaustible supplies of wood and stone for building materials. The rivers and streams are such as can be easily bridged. In each of the Mountain Ranges we have discovered two Passes, presenting no serious obstructions, and through which a Railroad can be easily conducted. The amount of tunneling is small, not probably exceeding in the whole route two miles. No untoward accident has occurred during the whole journey to interrupt or throw a shade over our labors."

From the partial report of Gov. Stevens to the War Department of a similar date to the above, is obtained the following as given in the columns of the New York Courier and Enquirer of Jan. 18, 1854.

The general character of the country between the Mississippi river and the mouth of the Yellow Stone, "is a level, open prairie, with a sufficient supply of timber, occurring in groves and the river bottoms for the purposes of the road." "Coal was also found in great abundance."

From the mouth of the Yellow Stone Gov. Stevens proceeded westward along the Milk river valley to Fort Benton. This valley is "very broad and densely timbered." From thence he crossed the Rocky mountains through Cadot's Pass, the return route of Capt. Lewis in 1805, which he found to be 1,500 feet *lower* than the South Pass, alluding, probably, to the first measurement of the latter by Col. Fremont. Cadot's Pass is stated to be "even now traversable by wagons. The party had one wagon with them on this part of their route." "They crossed the mountains between the middle and the end of September and saw no snow."

West of the mountains the country as anticipated is not as favorable, the surface being more irregular. This portion was under the immediate charge of Capt. McClellan who gives "a favorable account of it for the construction of a Railroad." The distance from the Mississippi to Olympia which is situated at the southern extremity of Puget Sound is stated to be 1800 miles. Had the line been carried to the nearest point on the Pacific waters, the distance would have been about 1,700 miles, as derived from odometer measurement. This is 100 miles more than the estimate on page 47.

It is stated that "the grade or rate of ascent, even in crossing the Rocky Mountains, will not exceed forty feet to the mile." The maximum as estimated at page 40, is 50 or 60 feet per mile. It is further stated that "on no part of the route need stations for wood and water be more than fifteen miles distant from one another." "And on the whole line but one tunnel will be required which will be three-fourths of a mile in length." It is supposed that "the snow will be no formidable obstacle, because the Indians of Oregon and Washington Territories habitually cross the mountains late in the fall, to hunt the buffalo in the eastern plains, and do not return until the first or middle of January." This is confirmatory of the statements of Lewis and Clark and of Capt. Bonneville as related in the first edition.

It thus appears that at all those points where any doubt could reasonably be entertained of the practicability of the Northern Route, the survey of Gov. Stevens fully confirms the correctness of the conclusions arrived at in the preceding pages, of its entire feasibility and suitableness for the construction of a Railroad, and of the character of the country for sustaining it when built.

From the other routes upon which surveys have been ordered by the Government, but few returns have been received. Senator Gwin in some remarks made by him to the Senate on the 12th of Dec., 1853, quotes the following from the journal of the late Capt. Gunnison, who had charge of the explorations on the route from St. Louis by the Upper Del Norte.

"Aug. 11. Within a mile of the summit of Sangre de Cristo. Elevation 8,400 feet."

"Aug. 12. We have at last reached the highest point on this part of the route. By a rough calculation I make the elevation 8,800 feet above the level of the sea."

After having passed the valley of the Del Norte on reaching the summit of the Cochatope Pass, Capt. G. thus writes: "At one o'clock Sept. 1, 1853, we stood upon the ridge dividing the waters of the Atlantic and Pacific Oceans. A storm of rain and hail passed over us, and as barometrical observations had to be taken, we built a fire. From these observations I make our height 11,082 feet above the sea."

These elevations are much higher than was assumed when comparing this route with others.

It was shown on page 127, that the valley at the head of the Del Norte was probably not less than 8,000 feet. The Cochatope summit was believed to be more than that. It is now known to be 3,000 feet higher, and the summit in the Sangre de Cristo mountain, on the east side of the Del Norte is also higher by 800 feet, and feet higher than the South Pass. From the latter summit it appears 1,300 that the descent is rapid towards the east being 400 feet in the first mile.

When Col. Frement ascended the peak which bears his name, he found the line of perpetual snow at the height of 10,000 feet. This was in latitude 43° N. nearly. The Cochatope Pass is about four degrees farther south. The difference in latitude will place the snow limit 1,500 to 2,000 feet higher, not so much higher as to prevent the Pass from being inconveniently near the line of perpetual congelation; so near to it, joined to the greater humidity of the air in winter, as to make the snows and the cold a very serious if not insurmountable obstacle to that route, aside from the very great elevation to be overcome.

Capt. Gunnison was preceded in his explorations of this route by the expedition of Supt. Beale, the Journal of which was kept by G. H. Heap. On the 18th of June this party reached the Cochatope Pass. On the 20th they were still on very elevated ground as they met "some small patches of snow near their trail." From thence to the Vegas of Santa Clara, they met with difficulties in the character of the streams and of the country, much of which was barren and rocky and apparently not very favorable as a route for a Railroad.

From Santa Clara their course was south-west to the mountains, which they crossed at the Cajon Pass which leads to Los Angelos. The country in this distance is very much as described by Fremont and others.

For over 300 miles they travelled a desolate region unfit for any of the purposes of life. On the 10th of August the heat was so intense "as to render it dangerous to travel by day," and at night "a hot wind blew from the southward." On the 13th they found the remains of an American, "his buckskin garments *not having been wet by the rain* proved that he had been killed *this season.*" On the 14th from a steep ridge, a magnificent but solemn and dreary view presented itself. Four ranges of mountains overtopping each other, extended from the north to the south, and bounded the western horizon. To the eastward was spread a wide extent of country which offered in every direction the same absence of timber and almost of vegetation. The solitude was unrelieved by the song of a bird or the chirp of an insect. The mournful murmur of the breeze as it swept over the desert, was the only sound that broke the silence." On the 15th "the heat was intense, and instead of diminishing as the sun descended, it became more oppressive. For twelve miles the road was over deep sand, into which the mules sank above their fetlocks." The desert from this point is described as extending 150 miles to the west. On the 16th "the heat increased as they advanced into the desert. The guns which we carried across the pummels of our saddles were hot to the touch, and to add to our annoyance and suffering the wind, ladened with an impalpable sand, blew fiercely from the southward, feeling as if issuing from the mouth of a furnace, and obliterating in many places all traces of the road. The mules already jaded by travelling across the sandy plain, went slowly along, their heads drooping to the ground. The pale moon occasionally overshadowed by clouds, threw a ghastly light over the desert, and bones glistening in her beams strewed the way, adding horror to the scene."

On the 17th during the night we had "a heavy storm, the howling wind was hot and filled with sand, and the rain fell in large drops without refreshing the air." "The Delaware killed a rabbit, the first of any game we had seen for a long time." "The desert retained its level and monotonous character until we arrived at the Mohave*h* river, our animals almost perishing from hunger and thirst." "The sandy soil through which the Mohave*h* flows, absorbs nearly all of its water, and when we reached it, it was no longer a running stream"

Aug. 19. The road was through heavy sand. On the 20th crossed the Mohave, 75 feet wide and 1 foot deep, and its water "was too warm to be drinkable." "The distance reached from Westport, Mo., this day was, by the estimate, 1,772 miles." The next day the party reached the Cajon Pass, six miles further, and descended to Los Angelos.

In consequence of the detention for some days of Capt. Beale and party at Grand river, where they were so unfortunate as to lose their arms and provisions by the upsetting of a canoe, and the slow progress made over the sandy and heated surface west of the Colorado, and the necessity of making direct for Los Angelos, their friends from San Francisco, who designed to meet them at Walker's Pass of the Nevada, were disappointed. At the head of this party was H. Edwards, Esq , acting Indian Agent. In the narrative of this expedition published in the San Francisco Herald, it is stated that from Walker's Pass at the head of Kern river, the Eesert which spreads off at the east appeared as an "unbroken plain extending as far as the eye can reach without sign of vegetation, save here and there tall columns of convoluted masses of the cactus From the summit of the Pass far to the south-east, a distance of 150 miles, may be seen the Black Mountain which the famous mountaineer Godey informed Mr. Edwards marked the line of the Mohave*h*. Godey had once attempted to cross the Desert from the Pass to the river, but not a blade of grass, nor a drop of water could be found on the route, and he was compelled to turn back and strike for the eastern slope of the mountain again, to save himself from perishing. No spurs start out from the Sierra into the Desert, although to the south-east, far out upon the plain, may be seen isolated buttes, and occasionally a short mountain called by travellers the Lost Mountains. From the commanding point at the Pass, the eye could discover no sign of water or timber, north, east or south."

Capt. J. Walker, a celebrated mountaineer, in notes of a trip across the Great Basin, recently published in the San Francisco Herald, gives a similar description of the Colorado Desert as viewed from the "elevated perch" of Walker's Pass. It is, he states, "a barren waste of sand, with here and there a growth of chemisal. The cactus is sometimes met with." The Mohave does not reach the Colorado, being absorbed in the sands. Capt. W. states that "80 or 90 miles north of Walker's Pass the country becomes broken, and rugged mountains traverse it in every direction."

He passed from the head waters of the Rio Virgen to those of the Sevier, or Nicolet river, which runs north-westerly into Nicolet Lake, and says the country between "is more cut up than any he ever met with on this continent." "It is torn all to pieces with *canôns*." The waters of the lower part of the Virgen are mostly absorbed by the sands of the desert. The country about its upper portion is represented as "frightfully repulsive." Capt. Walker thinks the Colorado navigable to the mouth of the Rio Virgen, and states that the Big *Canôn* of the Colorado "extends uninterruptedly from a point 30 miles above, for 300 miles. Its sides are lofty bluffs almost perpendicular. The waters wash up against these walls, leaving not a foot of slope between." The *canôn* opens at some points "leaving beautiful little valleys a little above the level of the river, but hundreds of feet below the tops of the *canôns*." The country between the Colorado and the Rio Grande del Norte, is "almost a desert with little timber. Grass and water very scarce." From the Colorado he followed the Rio Colorado Chequito, or little Red River, east to the Rio Del Norte at Albuquerque, and passed in his course a mountain of salt.

Capt. F. X. Aubrey traversed in July last the route from the Tejon Pass direct to Zuni and Albuquerque. At 67 miles he struck the Mohave river, which takes its rise in the San Bernardino Mountains to the south. He followed the river easterly 38 miles, then left it on a north-easterly course, to avoid the sand hills that lay in an easterly direction, the river bearing more to the south. At the distance of 155 miles he came, on the 22d of July, to the Great Colorado, which he found to be 900 feet wide, with 10 to 15 feet of water in the channel, and current rapid.

His description of the country from the Tejon Pass to the Colorado coincides with that of others. This entire region is a vast desert, affording scarcely grass and water sufficient to subsist the animals of a small party travelling rapidly over its sandy and gravelly surface. At the crossing of the Colorado the country was rough both to the north and to the south. In the former direction the rocks were black and irregular, and seemed to be volcanic. In the latter they seemed to be of sandstone. Neither timber or grass was found upon the river. From the Colorado east, no grass or timber was seen for about sixty miles, and for a further distance of about 85 miles there was no water. The remaining distance of 388 miles to Zuni, was much of it over a broken surface. Ridges or mountains covered wholly or partially with timber, such as the cedar, the pine, and the pinon, were noticed, between which the ground was believed to be practicable for a railroad. Water in many places was scarce, and the soil in the valleys generally inferior and destitute of timber. At one place *canons* were met with supposed to be 4,000 feet deep, the bottoms not being visible. On the banks of the Colorado gold was found, and at one or two other points copper and silver were also noticed. When 175 miles only from Zuni they met with Indians who used gold bullets. Whether these were the product of the country or obtained by the murder of miners in California or Sonora, Capt. A. was unable to discover. From Zuni to Albuquerque the travelled distance is 145 miles."

The above description of the country corresponds very nearly with that of Capt. Walker, and with the general description of the same region given by Col. Emory, from such information as he was able to obtain when passing down the Del Norte and the Gila.

This route continued to Memphis is the one now being explored by Lieut. Whipple, from whom no returns have yet been received. The general character of the surface east of the Rio Del Norte has already been fully described. Capt. Marcy in a letter to the Memphis Convention places the western limit of the timber on this route at the 99th degree of west longitude, which corresponds with the information derived from others. West of this line "there is but little timber, except on the immediate borders of the water-courses. The soil becomes thin and sandy, and owing to the periodical drought of the summer season it cannot be made available for agriculture without the aid of artificial irrigation." Capt. M. imagines there will be but little difficulty so far as the surface of the country is concerned, in constructing a railroad from Albuquerque to St. Louis." The distance he estimates at 1,145 miles, and to Memphis 1,080 miles. This route from St. Louis, from present appearances, is likely to prove superior to any which can be found crossing the Del Norte farther north.

Capt. Marcy considers the line from Memphis to the valley of the Rio Grande Del Norte at El Paso, and thence to the Gila, as superior to the one leading through Albuquerque. He states that "the arable soil on this route extends three degrees of longitude further west than upon any of the more northerly routes. East of the Del Norte for 300 miles, in latitude 35 north, is "a high prairie plain, intersected by three ranges of mountains, upon which there is much good timber." "After passing this section the road for 300 miles across the sources of the Brazos river passes through a district where the soil is good, abundantly watered, and covered for the most part with a heavy growth of mesquit wood" From thence to Memphis the country is similar to that farther north, east of the longitude of 99° west. Coal is said to be found near Fort Belknap on the Brazos river. It is also found in the vicinity of the Spanish Peaks east of the Upper Del Norte, and at several points south.

In respect to the most southern route Mr. Bartlett, late boundary commissioner, furnishes the following in a recent letter to the

President of the Pacific Railroad Company. The remarkable depression in the mountain range between the Del Norte and the Gila is embraced in a belt of 80 to 100 miles in width from latitude 31 1-3° to 32 1-2° N. Within this space is an elevated plateau 4,500 to 5,000 feet above the sea, covered with short isolated ridges or mountains 1,000 to 2,000 feet in height.

A line of railroad carried across to the Pacific through this region must pass into Mexican territory west of the San Pedro, the valley of the Gila being impracticable, in which opinion Mr. B. is supported by Lieut. Whipple. West of the San Pedro are mountains across which Mr. B. *supposes* there is a practicable pass for a railroad.

The Tucson Desert west of these mountains is 100 to 120 miles across, and the distance to the Colorado 250 miles.

The Colorado at Fort Yuma is 600 feet wide and 4 to 5 feet deep in the dry season. This is a much less section than given by Col. Emory, (see p. 121.) The observations of different observers vary very considerably, owing in part doubtless to the great fluctuations of the stream, and in part perhaps to the shifting character of the bars, produced by the sands from the Desert above.

The Desert west of the Colorado is "100 miles across, and increases in width towards the north." It is "destitute of wood, water, and grass, and presents a hard level surface." The belt of moving sand west of the Colorado extends 12 miles below Fort Yuma into Mexican territory, from which point it widens off towards the north.

Mr. B. states that "the great plains, plateaus and deserts to which he has alluded, are without wood. They are also nearly destitute of water and grass." Pine timber is found in one place near the copper mines in lat. 32° 35′ N., together with small oaks and cedars. Other mountain ranges are similarly wooded, and there are some valleys thickly covered with mesquit. Steamers with a light draught of water can ascend the Colorado 100 miles from Fort Yuma, but the Gila can only be navigated in high water. Flat-bottomed boats may possibly pass up to the Salinos, 180 miles.

Mr. B. states that "any route south of the parallel of 34½° must cross the great *Llano Estacado* (staked plain) east of the Rocky Mountains, which increases much in width above the 32d parallel." He "crossed it about 31½° to the Pecos, a distance of 70 miles, without water." A degree farther north "its width is more than doubled." He states that "the region between the Pecos and the Rio Grande Del Norte is equally barren, (as far as known,) and must also be crossed by any route south of the 34th parallel."

The several authorities quoted above fully confirm what was stated in the first edition in respect to the physical character of the vast region which lies between the long. of about 100° W. and the Sierra Nevada and San Bernardino mountains, embracing a distance of over 1,000 miles upon any of the projected routes proceeding from St. Louis, or any point south, to San Francisco or San Diego.

Much the greater portion of this immense region is destitute of timber, and where found upon the rocky slopes of the mountains, is difficult to obtain. Large tracts are wholly destitute of water, and no portion of the surface can be cultivated except by irrigation; the means for doing which are greatly limited in the dry season, the streams at no time large or numerous, being then very much reduced in number and size.

A large portion of the surface west of the Colorado is a waste of drifting sands. The remainder of this desert, according to Mr. Bartlett, "presents a hard level surface;" a hardness which in all places where it occurs as far east as the eastern limit of the "staked plain," appears to be the joint effect of great heat with little moisture upon a soil having a sufficient admixture of clay for the purpose; a condition which, owing to the dryness of the climate, it may be hazardous in many places to disturb, either for the purpose of culture or the grading of a railroad. The Desert west of the Colorado may have a tolerably even surface, but cannot be so level as Mr. B. intimates. The Pass of the San Bernardino Mountains is 3,000 feet above the sea, according to Col. Emory, and the overhanging cliffs are 3,000 feet higher still. The Pass cannot be very far from the western limit of the Desert, and hence that limit must be sufficiently elevated to give to the surface of the Desert a very considerable inclination. Notwithstanding the apparent evenness of the surface upon the plains, plateaus and deserts where they occur upon any of the routes, that surface must probably be broken up in constructing a railroad, and excavations and embankments made to a far greater extent than would be supposed necessary to an inexperienced eye. From near the San Bernardino Pass to a point eighty miles up the Gila, according to Maj. Andrews, no building stone is to be found.

The difficulties of constructing, maintaining and operating a railway in a region such as is found for most of the distance between long. 100° W. and the Pacific, and the impossibility of collecting in its vicinity a population such as is needful for the support and security of the road when built, have already been sufficiently considered in another place.

In respect to the passage of the Sierra Nevada Mountains the difficulties are found to be greater than was supposed. Lieutenant Williamson, writing from Posè creek, six miles north of Kern river near Kern lake, says "the Tejon Pass has its summit about 4,500 feet above Kern lake, and nearly all of this ascent is to be gained in ten miles, or must be reduced by tunnelling." This is an average ascent of 450 feet per mile.

If the gradient is allowed to ascend at the unprecedented rate of 150 feet per mile, the tunnel at the summit will be 3,000 feet below the surface! Lieut. W. might have said that in addition to any possible reduction by tunnelling, it would probably be necessary to resort to stationary power.

Near the Tejon Pass, is the Pass de los Uras, 1,400 feet lower, notwithstanding which Lieut. Williamson appears to be of opinion that the best point for crossing is by "one of the Passes leading into the Tejon." He "conceives Walker's Pass to be almost out of the question,"—"not as good, and badly situated." The elevation of Kern lake is not given; but as it lies near the head of the Tulare and San Joaquin valleys, it must have a height sufficient to give the Tejon Pass an elevation of not less than 5,000 feet above the sea, which was the height assumed (p. 123) for Walker's Pass, which is known to be higher than the Tejon.

Lieut. Stoneham in a letter to Maj. Cross dated Posè creek, (Tulare valley,) Aug. 23, 1853, states, that from the Tejon Pass to the northern extremity of the valley, the distance by the road is 197 miles; direct distance 150 miles.

"Through the whole length of this valley runs a Tula marsh, which expands in some places into lakes." These at times [illegible] connected by sluggish streams, and at others not so. "The whole of that portion of the valley which lies west of the Tula Lakes is worthless in the extreme." "The proportion of this immense valley, which can possibly be looked upon as inhabitable, is small indeed. In all not more than 375 square miles, or one-twentieth part." With the exception of certain places mentioned, "there is no timber throughout the length and breadth of the whole valley." The length being 150 miles, the average breadth of the portion which has any value is 25 miles! And this extends half way from the Tejon Pass to the Bay of San Francisco, in a valley which is said to surpass greatly in its arable character the region lying to the west of it between the Coast Range and the sea. The San Joaquin is but little superior in character to the Tulare valley. The mean breadth of the arable or productive portion is said to be greater, but the proportion of the latter is quite limited, compared to the great extent of barren and worthless surface. The portions of these valleys which appear to have any value for culture are those only which are or can be watered by the streams which are formed or increased by the melting of the snows in June and July on the mountain heights of the Sierra Nevada.

The Bill now before Congress to aid in the construction of the portion of the proposed Pacific Railroad within the limits of California, appropriates every alternate section of land for a width of *forty* miles throughout its entire length. The provision in other similar Bills of doubling the price of the sections retained by the Government is not embraced in this. The road contemplated by the Bill extends the entire length of the State. The grant proposed is probably not too liberal for the purpose. It shows how little is the value placed upon the country for settlement or for any other purpose.

This peculiar character of the country lying to the south of the Bay of San Francisco, so remarkable for its limited agricultural resources, and consequent limited ability to sustain within itself a very large population, should not be overlooked in considering the ultimate destiny of the city which stands at its entrance, and aspires to be the great commercial mart of the Pacific.

The Sierra Nevada mountains, it has been shown, present towards the east an almost insurmountable barrier to the opening of a communication with the interior in that direction.*

Beyond the Nevada Mountains lies the barren waste of the Great Basin, stretching on to the Great Salt Lake, and to the south-east, the arid and sandy plains of the lower Colorado. The valleys and slopes lying between the Sierra Nevada and the Coast Range, and between the latter and the sea, are limited in extent, and but a small portion of the surface thus limited, can be made productive What is true in this respect of Southern California is also true, though not in so great a degree, of Northern California. The Sacramento valley embraces within its borders the best timbered and most productive lands within the limits of the State, and it is here that most of the population of California, out of the city of San Francisco, is now located. More than five-sixths of the present population of California is to be found in the northern half of the State.

In view of this the question very naturally arises, whether San Francisco possesses in fact the natural advantages necessary to render it the leading maritime city on the Pacific? The answer is not a very difficult one to make. As a Port for the accommodation of the section of country immediately dependant upon it, it will always possess very considerable importance. As the terminus of a through route to the Atlantic States, its position is inferior to that of San Diego, the latter being over 400 miles nearer to the Colorado, with a summit, in the San Bernardino Range, of only 3,000 feet in elevation to be overcome.

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* There are two Passes of which no mention has been made, viz: Ebbet's, situated due east nearly from San Francisco, and Noble's, about 100 miles to the north, neither of which can reasonably be supposed to be as favorable as the Tejon, or even Walker's Pass, either as to elevation or accessibility.

So long, however, as there are other points more favorably situated in relation to the foreign and internal commerce of the Pacific coast, neither San Diego nor San Francisco can control that commerce.

The points referred to are the mouth of the Columbia and the Straits of De Fuca. From either of these can be established the shortest and best communication with the great cities of Eastern Asia, and from these points only can a direct and easy access be had to a vast and fertile interior,—an interior which embraces the wide valley of the Columbia, unequalled in extent and productiveness, on our Pacific coast, and which opens naturally and easily into that of the Missouri, and with the latter and the St. Lawrence system, affording facilities for a chain of inland communication across the continent unequalled in character and importance by any other practicable route.

Notwithstanding the advance which San Francisco has already made under the extraordinary stimulus derived from the discovery of gold in the sands of the Sacramento, it must yet yield the palm as a great commercial mart to a more northern rival.

Within the mouth of the Columbia or upon the waters of De Fuca will yet arise the Queen City of the Pacific. No concentration of capital, however large, controlled by a corporation however gigantic, can prevent this result. The power of the Government, even if adversely directed, allowing such a supposition to be possible, would be exerted in vain to prevent it.

Wherever that emporium is to be, whether at the mouth of the noble Columbia or on one of the beautiful Bays that open out upon the Straits of De Fuca, a high destiny awaits it. It should be the ambition of all who are instrumental to its growth to render it the model city of the world. No unfriendly elements should be allowed to mingle in and mar its fair proportions. It should be in all respects a fitting exponent of the benign and elevating influence of our free institutions, and should occupy the very foremost place among the great cities of Christendom, reflecting upon the isles of the Pacific and upon the shores of Eastern Asia, over which it is destined to have a vast influence, the light of the most improved civilization.

It should, in fine, possess socially and morally as well as physically, that solidity of structure and completeness in its proportions which will cause it to harmonize in beauty and in grandeur, with the magnificent scenery by which it will be surrounded.

CONTENTS.

Page.
INTRODUCTION..........3

GENERAL VIEW.

Prominent Ports on the Atlantic and Pacific coasts. Superiority of the Straits of De Fuca compared with other points on the Pacific..........5
New York City the most important Port on the Atlantic. Considerations in regard to the most eligible route..........6
Shanghai in China, a central point in respect to the principal Asiatic cities. The Straits of De Fuca in the direct route from New York to Shanghai. The City of Chicago a point in the proposed route..........7
Direct distance from Chicago to De Fuca. The Great Bend of the Missouri a point in the proposed route..........8
Character of Rocky Mountains at the Sources of the Missouri, and depression of the Mountain Chain at that point..........9
Estimated length of route from Chicago. Portions completed and in progress, also portions included in existing acts of incorporation..........11
Government Survey under Gov. Stevens, and charter in Minnesota..........12
Gauge of Road. Harbor and Depot accommodations at Chicago..........13

DESCRIPTION OF PROPOSED ROUTE, CHARACTER OF SURFACE, ETC.

Elevation of Lake Michigan at Chicago..........14
Character of country between Lake Michigan and the Mississippi. Its general elevation. Character of line from Janesville to Madison..........15
Character of line west of Madison. Approach to the Mississippi at La Crosse. Interior route from Madison..........16
Character of the river route from La Crosse. Proposed point of crossing the Mississippi at the Falls of St. Anthony..........17
Course of the line and character of the surface from the Mississippi to the Red river of the North. The Hauteurs des terres..........18
Crossing of Red river. Inclination of its channel. Level character of its valley..........19
Elevation of Coteau du Missouri and of Fort Pierre on Missouri river..........20
Inclination of channel of Missouri, from mouth of Yellow Stone to its junction with the Mississippi..........21
Estimated elevation of Missouri at the mouth of the Yellow Stone and at Fort Mandan. Near approach of Moose river to the Missouri..........22
Canal practicable from the Upper Missouri to the St. Peters river and to Lake Superior; also to James and Red rivers. Character of the Missouri above the Yellow Stone..........23
Dimensions of Yellow Stone and Missouri rivers. Estimated elevation of the Missouri at the foot of the Great Falls..........24
Descriptions of Lewis and Clark confirmed by Culbertson..........25
Character of proposed Road from Fort Mandan to the Great Falls of the Missouri..........26
Description of the Falls. Extent of navigation above the Falls. Crossing of Lewis and Clark to Salmon river and Clark's river..........27
Return of Lewis and Clark. *Lewis Pass*..........28
Journal of Capt. Lewis from Clark's river to the Missouri..........29
Estimated elevation of main summit of Rocky Mountains, and descent of ground on each side. Gate of Mountains..........32
Circumstances indicative of a Low elevation of Lewis Pass. Character of the Yellow Stone river..........33
Pass from the Jefferson to the Salmon river. Character of the latter river..........35
Clark's Pass. Its probable elevation. Other Passes through the Mountains..........36
Vegetation of the Mountain Passes. Similarity of the Flora of the valleys of the Columbia, Missouri and Saskatshawan..........39
Character of the route across the Main Summit, and of Clark's River valley, and the valley of the Columbia. Elevation of the latter..........40
Passage of the Cascade Range and descent to the Pacific..........44
Estimate of cost of the proposed Road..........47

CLIMATE, SOIL AND PRODUCTIONS.

Agricultural and Mineral resources, and climate of Northern Illinois and of Wisconsin..........50
Minnesota, character and elevation of its surface, similarity of its productions to those of New England..........51
Climate of Minnesota. Isothermal line of 50° F. Its course across the Continent..........55
Isothermal lines of 45° F. and 50° F..........56
Climate and productions of the Upper Missouri valley..........60
Character of the Saskatshawan valley and of Clark's river valley..........63
Mission Station of St. Ignatius. Fisheries on the Columbia. Climate. Cascade Mountains..........65
Mild character of the climate on the Pacific. Soil and productions..........68

Page.

MINERALS.

Lead, Copper and Iron of Wisconsin........71
Salt in Minnesota, Coal in the Upper Missouri and Saskatshawan valleys........72
Granite, Sandstone, and Limestone in the Upper Missouri valley........73
Lead, and probably Platina between the Rocky and Cascade Mountains........74
Bituminous Coal on the waters of the Straits of De Fuca, and Vancouvers Island........75

OBSTRUCTIONS FROM SNOWS.

Laws which govern the fall of snow and rain........77
Actual fall of rain and snow in Wisconsin and Minnesota........80
Depth of snow in the valley of the Upper Missouri........81
Sources of the Upper Missouri never much swollen by spring floods........83
Snow in Lewis Pass........84
Clark's river open in February. Snows on Cascade Range........86
Obstructions from snows more serious in more southern latitudes........88

TERMINI ON THE PACIFIC AND ON THE LAKES.

Straits of De Fuca and waters connected therewith........90
Mouth of Columbia........92
San Francisco........93
San Diego........94
Ports in Eastern Asia........95
Isthmus Canal and Railroads........96
Route from De Fuca to China........97
Termini on Lake Superior........98
Termini on Lake Michigan........99
Future prospects of Chicago........100
Cheap transportation on the Lakes and the Canals of New York. Value of property transported annually........101
Navigable connections with the proposed Road, and navigable character of the Missouri river..102
Hydraulic power and attractions of the Falls of the Missouri........103

COMPARISON OF ROUTES.

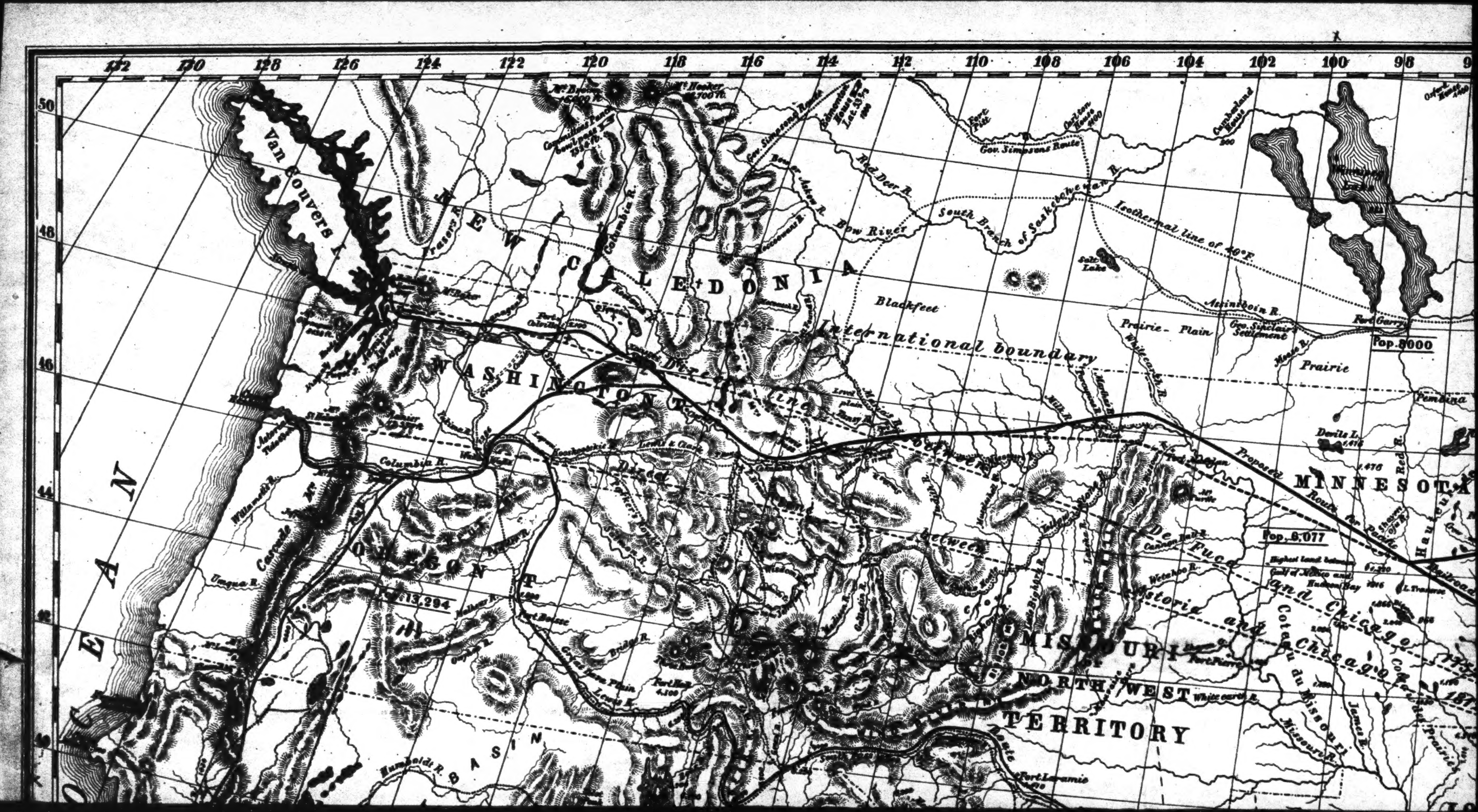
Mr. Whitney's Route. Bighorn Mountains........105
South Pass Route, its character, &c........108
General topographical description of the country between the South Pass route and the Mexican boundary........110
Valley of the Great Colorado, its descent, &c........112
Sierra Nevada Mountains and Coast Range........113
The "Great Basin." Its desert character, &c........114
Character of the country at the mouth of the Colorado, and between that river and the Rocky Mountains........117
Quantity of water flowing in the Del Norte, the Gila and the Colorado rivers........121
Height of Sierra Nevada Mountains and difficulty of passing them........122
Route from San Francisco to the Walker and Tejon Passes........123
Estimated distance from San Francisco to St. Louis and to Memphis........124
Estimate of distances on the Southern route........125
Elevation of the Mountain Passes near the Upper Del Norte valley........127
Elevation of Main Summit on most southern route........129
Considerations in respects to cost of Central and Southern routes........131
Considerations in favor of the most southern routes........134
Relative interest of States east of the Mississippi in the Southern and Northern routes........135
Relation of San Francisco to Southern routes........138
Connection of California with Oregon and Washington. Northern route to California........139

GENERAL REMARKS.

Journal of Lewis and Clark. Its character........143
Comparison of summits and mode of estimating distances........145
Considerations respecting cost and time of constructing northern route........146
Government aid. The Northern the best emigrant route........147
Productiveness of Railroads. Nearness of the Northern route to the international boundary no objection........149
Railway improvements in the Canadas........151
Increase of the population of the United States. Western movement of do........152
Population of, and commercial relations with the Canadas........154

SUPPLEMENT TO THE SECOND EDITION.

Measurement of Lewis Pass on Northern route by Lieut. Saxton........157
Elevation of the mouth of the Yellow Stone river by Gov. Stevens........158
Elevation of the Coteau du Missouri. Arrival of Gov. Stevens on the Pacific. His opinion of the general character of the Northern route........159
Probable maximum gradient in passing the Rocky Mountains on the Northern route........160
Measurement of the Cochatope Pass at the head of the Del Norte. Expeditiou of Supt. Beale. Description of the Country from the Cochatope Pass to the California Mountains........162
Expedition from San Francisco to meet Supt. Beale. Description of Walker's Pass &c........164
Capt. J. Walker's account of the Colorado valley........165
Capt. Aubrey's exploration from the Tejon Pass to Albuquerque. Character of the country........166
Capt. Marcy's opinion of the route from Memphis........167
Commissioner Bartlett's description of the country near the Mexican boundary........168
Measurement of Passes in the Sierra Nevada Mountains by Lieut. Williamson........170
Lieut. Stoneham's description of the Tulare valley. Character of Southern California........171
San Francisco as a commercial mart compared with San Diego, the mouth of the Columbia, and Straits of De Fuca........172
Superiority in position of the latter. Considerations relating to the future growth of the emporium of the Pacific........173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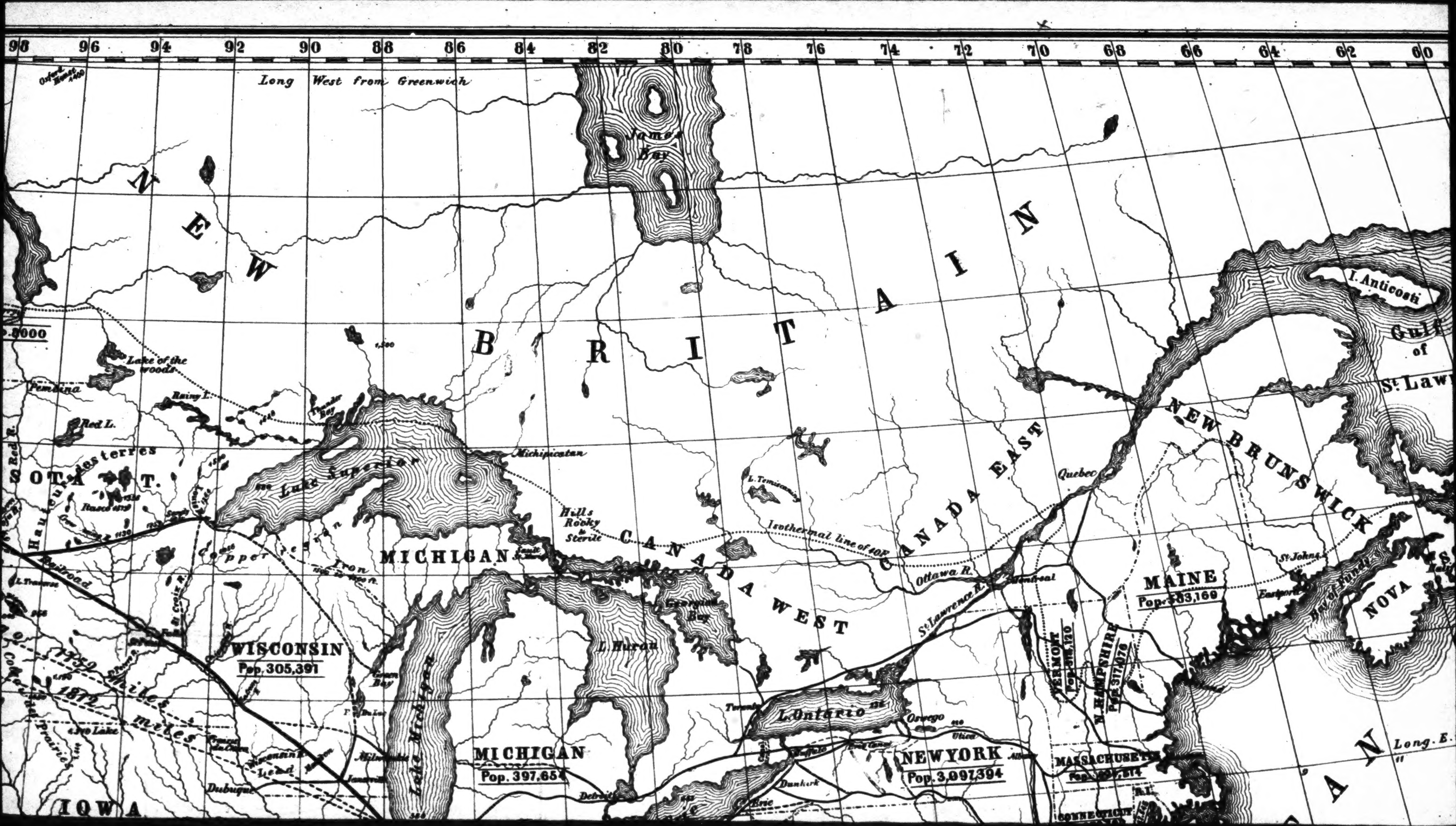
Van Couvers I.
NEW CALEDONIA
WASHINGTON T.
OREGON T.
MISSOURI or NORTH WEST TERRITORY
MINNESOTA
BASIN
O C E A N
Mt. Brown 16,000 ft.
Mt. Hooker 15,700 ft.
Fraser's R.
Columbia R.
Mt. Baker
Fort Colville
Mt. St. Helens
Rainier
Astoria
Columbia R.
Willamette R.
Cascade
Umqua R.
Pop. 13,294
Fort Boisse
Bridge R.
Lewis R.
Fort Hall 4,100
Humboldt R.
Lewis & Clark
Gov. Simpsons Route
Edmonton House
Red Deer R.
Bow River
Fort Pitt
Carlton House
Cumberland House
South Branch of Saskatchewan R.
Isothermal line of 40° F.
Salt Lake
Blackfeet
International boundary
Prairie - Plain
Assiniboin R.
Gov. Sinclair's Settlement
Fort Garry
Pop. 8000
Moose R.
Prairie
Pembina
Devils L.
Red R.
White earth R.
Milk R.
Level plain
Proposed Route for Pacific Railroad
De Fuca
Astoria and Chicago
and Chicago
Fort Pierre
Pop. 6,077
Highest land between Gulf of Mexico and Hudson Bay
Coteau du Missouri
Missouri R.
James R.
Fort Laramie
Route
TERRITORY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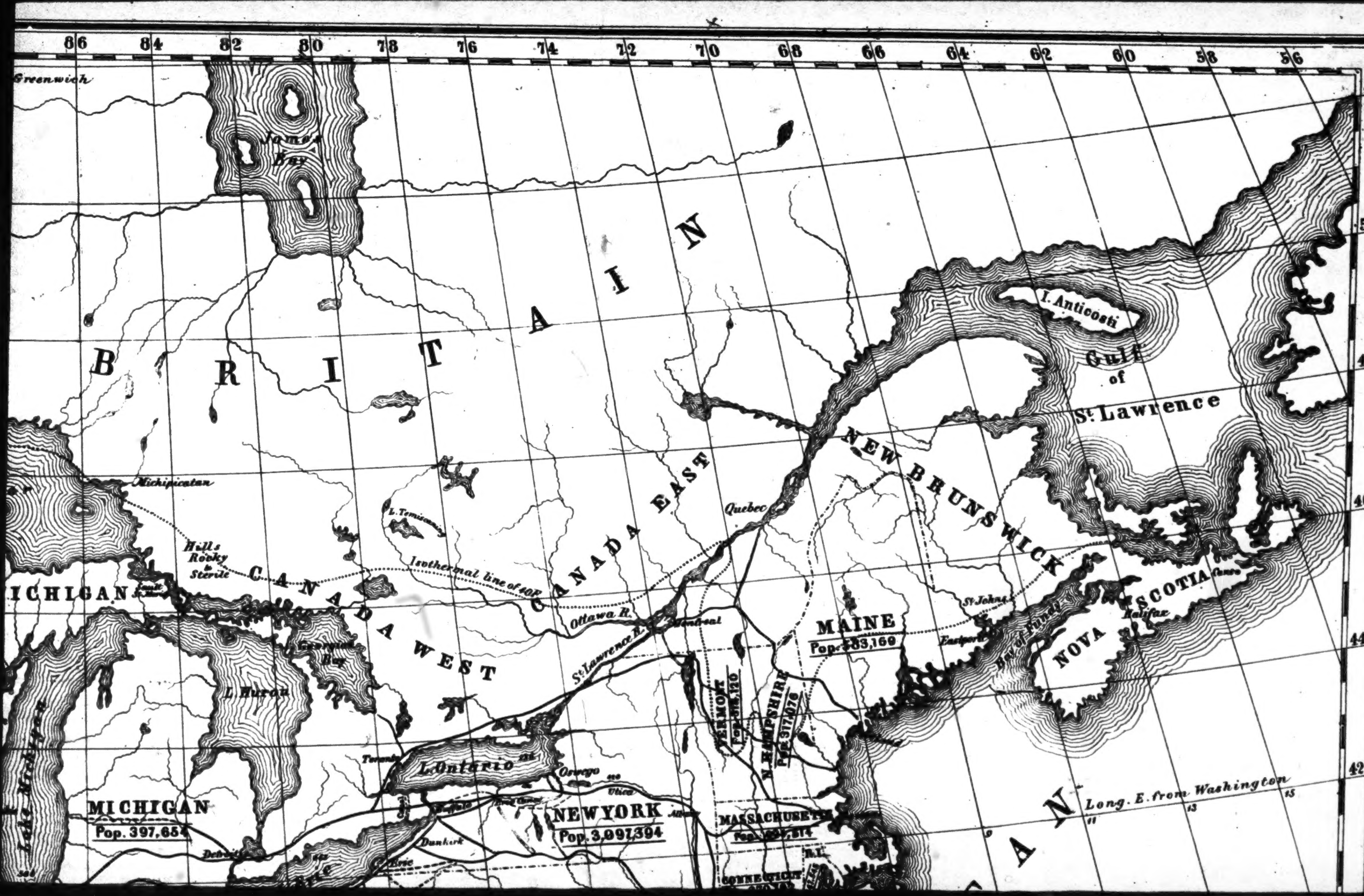
Long West from Greenwich
Oxford House
NEW BRITAIN
James Bay
I. Anticosti
Gulf of St. Law
Lake of the woods
Pembina
Rainy L.
Red L.
Red R.
SOTA T.
Hauteur des terres
Itasca
Lake Superior
Michipicotan
Hills Rocky & Sterile
CANADA WEST
CANADA EAST
NEW BRUNSWICK
Isothermal line of 40F
L. Temiscaming
Quebec
Ottawa R.
Montreal
St. Lawrence R.
St. Johns
Eastport
Bay of Fundy
NOVA S
MICHIGAN
Copper
Iron
Sault St. Marie
Railroad
L. Traverse
St. Croix R.
St. Paul
1750 miles
1872 miles
Coteau des Prairie
Lake
WISCONSIN
Pop. 305,391
Green Bay
F. du Lac
Prairie du Chien
Wisconsin R.
Lead
Milwaukee
Janesville
Dubuque
IOWA
Lake Michigan
MICHIGAN
Pop. 397,654
Detroit
L. Huron
Georgian Bay
Toronto
L. Ontario
Oswego
Utica
Buffalo
Dunkirk
Erie
NEW YORK
Pop. 3,097,394
Albany
VERMONT
Pop. 314,120
N. HAMPSHIRE
Pop. 317,976
MAINE
Pop. 583,169
MASSACHUSETTS
R.I.
CONNECTICUT
Long. E.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James Bay
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CANADA WEST
NEW BRUNSWICK
I. Anticosti
Gulf of St. Lawrence
Michipicotan
Hills Rocky & Sterile
Isothermal line of 40°
L. Temiscamingue
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Montreal
St. Lawrence R.
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Georgian Bay
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Utica
Albany
Dunkirk
Erie
Detroit
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VERMONT
Pop. 314,120
N. HAMPSHIRE
Pop. 317,976
MAINE
Pop. 583,169
MASSACHUSETTS
Pop. 994,514
R.I.
CONNECTICUT
St. Johns
Eastport
Bay of Fundy
NOVA SCOTIA
Halifax
Canso
OCEAN
Long. E. from Washington
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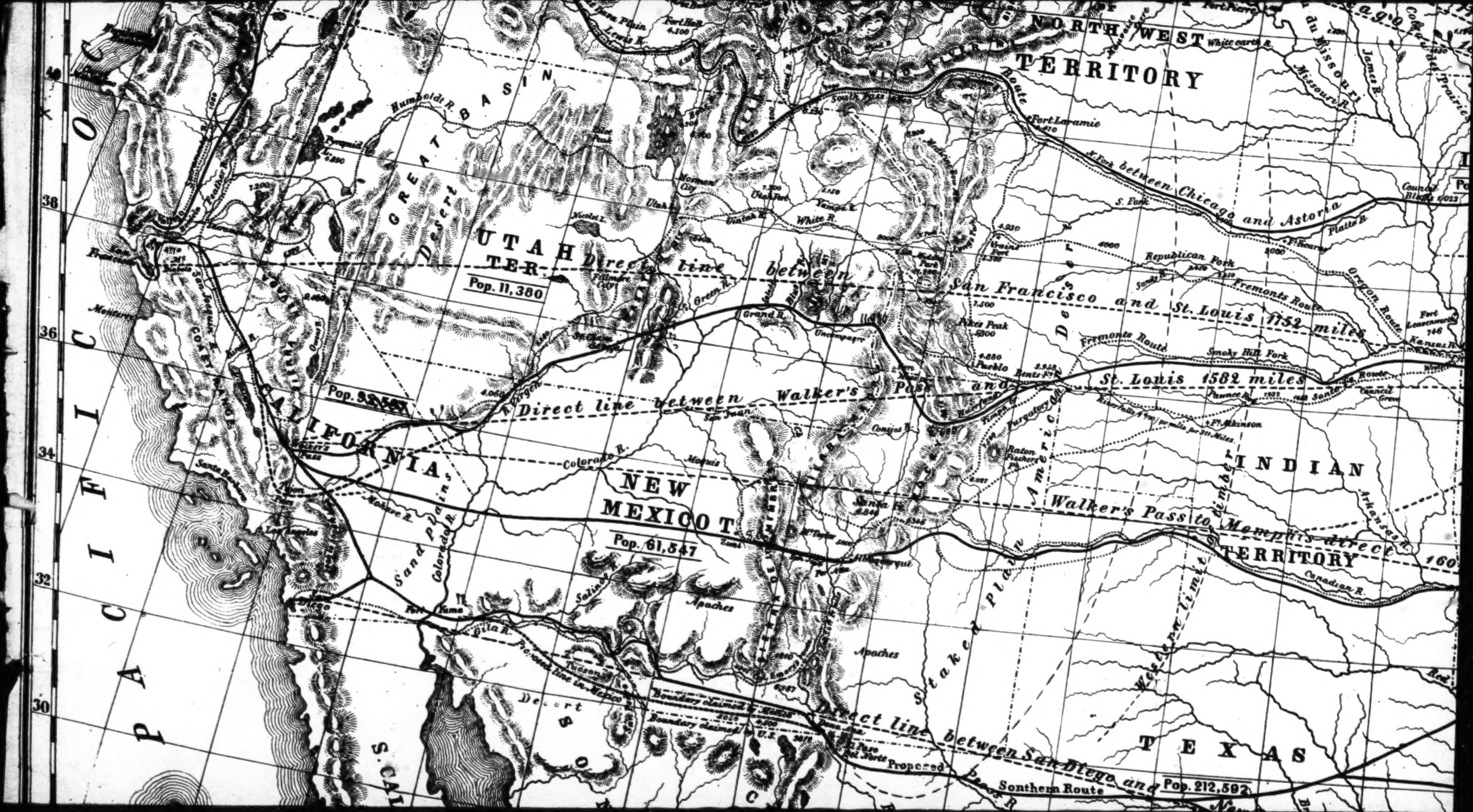

PACIFIC
OC
GREAT BASIN
Desert
UTAH TER.
Pop. 11,380
CALIFORNIA
Pop. 92,597
NEW MEXICO T.
Pop. 61,547
NORTH WEST TERRITORY
INDIAN TERRITORY
TEXAS
Pop. 212,592
Route between Chicago and Astoria
Direct line between San Francisco and St. Louis 1752 miles
Direct line between Walker's Pass and St. Louis 1582 miles
Walker's Pass to Memphis direct 160
Direct line between San Diego and
Proposed line in Mexico
Proposed
Southern Route
Boundary claimed by Mexico
Boundary claimed by U.S.
Fremonts Route
Oregon Route
Western limit of timber
Staked Plain
American Desert
Sand Plains
San Francisco
Monterey
Santa Barbara
Los Angeles
Walker's Pass
Fort Yuma
Gila R.
Colorado R.
Mohave R.
Humboldt R.
Lewis R.
Fort Hall
South Pass
Fort Laramie
Council Bluffs
Platte R.
S. Fork
Republican Fork
Smoky Hill Fork
Fort Leavenworth
Kansas R.
Pikes Peak
Pueblo
Bents Ft.
Raton Pass
Ft. Atkinson
Pawnee R.
Council Grove
Arkansas R.
Canadian R.
Red
Santa Fe
Albuquerque
El Paso
Apaches
Moquis
Zuni
Grand R.
Green R.
Uncompagre
Mormon City
Utah L.
Fillmore City
Yampa R.
White R.
White earth R.
Missouri R.
James R.
Fort Pierre
Nicolet L.
Tucson
Desert
Sonora
S. Cal
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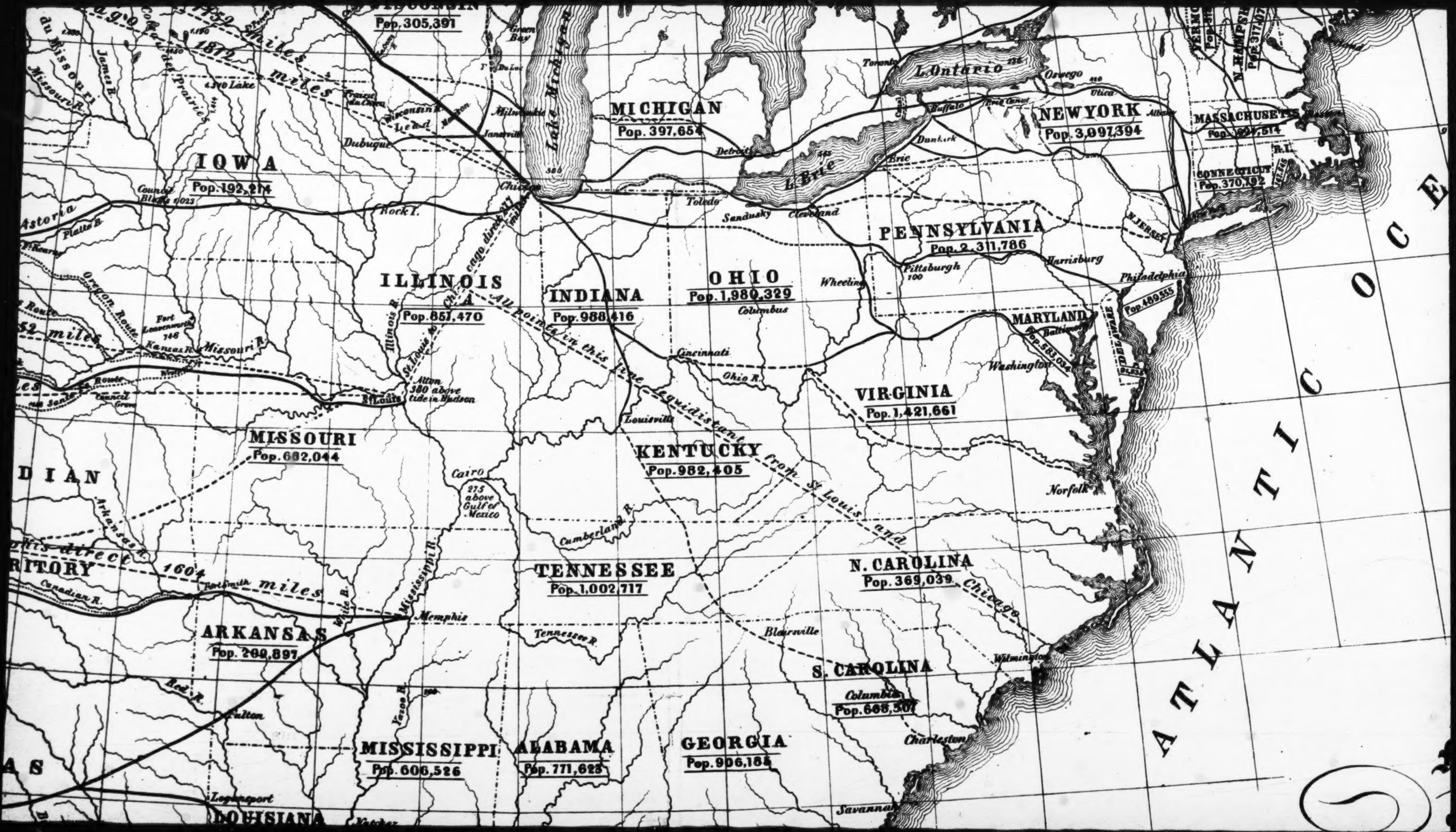
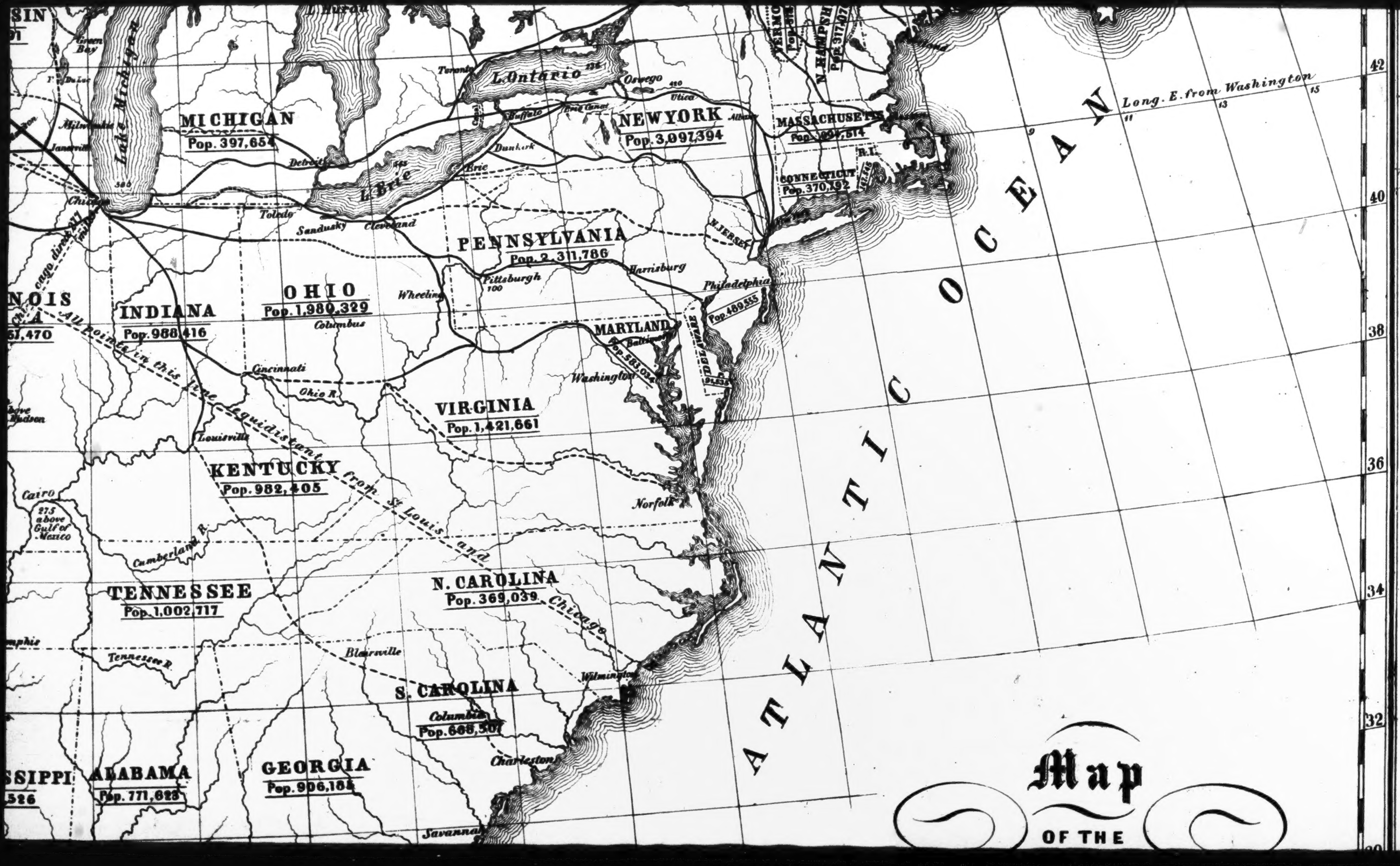

WISCONSIN
Pop. 305,391
MICHIGAN
Pop. 397,654
NEWYORK
Pop. 3,097,394
MASSACHUSETTS
N. HAMPSH
Pop. 317,976
VERMO
CONNECTICUT
Pop. 370,792
R.I.
147,545
N. JERSEY
Pop. 489,555
IOWA
Pop. 192,214
PENNSYLVANIA
Pop. 2,311,786
ILLINOIS
Pop. 851,470
INDIANA
Pop. 988,416
OHIO
Pop. 1,980,329
MARYLAND
Pop. 583,034
DELAWARE
91,535
VIRGINIA
Pop. 1,421,661
MISSOURI
Pop. 682,044
KENTUCKY
Pop. 982,405
DIAN
RITORY
TENNESSEE
Pop. 1,002,717
N. CAROLINA
Pop. 369,039
ARKANSAS
Pop. 209,897
S. CAROLINA
Pop. 668,507
MISSISSIPPI
Pop. 606,526
ALABAMA
Pop. 771,623
GEORGIA
Pop. 906,185
AS
LOUISIANA
ATLANTIC OCE
L. Ontario
L. Erie
Lake Michigan
Green Bay
Milwaukie
Janesville
Dubuque
Wisconsin R.
Lead
Prairie du Chien
Chicago
Rock I.
Council Bluffs 1023
Astoria
Platte R.
Ft. Kearny
Oregon Route
Fort Leavenworth 746
Kansas R.
Missouri R.
Council Grove
Santa Fe Route
St. Louis
Alton 380 above tide in Hudson
Illinois R.
St. Louis to Chicago direct 277 miles
All points in this line equidistant from St. Louis and Chicago
1812 miles
1752 miles
52 miles
1604 miles
Cairo
275 above Gulf of Mexico
Mississippi R.
Memphis
White R.
Arkansas R.
Canadian R.
Fort Smith
Red R.
Fulton
Yazoo R.
Natchez
Logansport
Toledo
Sandusky
Cleveland
Detroit
Erie
Dunkirk
Buffalo
Erie Canal
Toronto
Oswego
Utica
Albany
Harrisburg
Philadelphia
Pittsburgh 100
Wheeling
Columbus
Cincinnati
Ohio R.
Louisville
Baltimore
Washington
Norfolk
Cumberland R.
Tennessee R.
Blairsville
Wilmington
Columbia
Charleston
Savannah
du Missouri
Missouri R.
James R.
Coteau des Prairies
Lake



SIN
Green Bay
Milwaukee
Janesville
Lake Michigan
Chicago
Chicago direct 217 miles
NOIS
61,470
MICHIGAN
Pop. 397,654
Huron
Detroit
Toronto
L. Ontario
Oswego
Utica
Buffalo
Erie Canal
Dunkirk
Erie
L. Erie
Toledo
Sandusky
Cleveland
NEWYORK
Pop. 3,097,394
Albany
VERMONT
N. HAMPSHIRE
Pop. 317,07
MASSACHUSETTS
Pop. 994,514
R.I.
147,545
CONNECTICUT
Pop. 370,792
N. JERSEY
New York
PENNSYLVANIA
Pop. 2,311,786
Harrisburg
Pittsburgh
Philadelphia
Pop. 489,555
MARYLAND
Baltimore
Pop. 583,034
Washington
DELAWARE
91,535
Wheeling
OHIO
Pop. 1,980,329
Columbus
INDIANA
Pop. 988,416
Cincinnati
Ohio R.
All points in this line equidistant from St. Louis and Chicago
VIRGINIA
Pop. 1,421,661
Norfolk
above Hudson
Louisville
KENTUCKY
Pop. 982,405
Cairo
275 above Gulf of Mexico
Cumberland R.
TENNESSEE
Pop. 1,002,717
Memphis
Tennessee R.
N. CAROLINA
Pop. 369,039
Blairsville
Wilmington
S. CAROLINA
Columbia
Pop. 668,507
Charleston
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526
ALABAMA
Pop. 771,623
GEORGIA
Pop. 906,185
Savannah
ATLANTIC OCEAN
Long. E. from Washington
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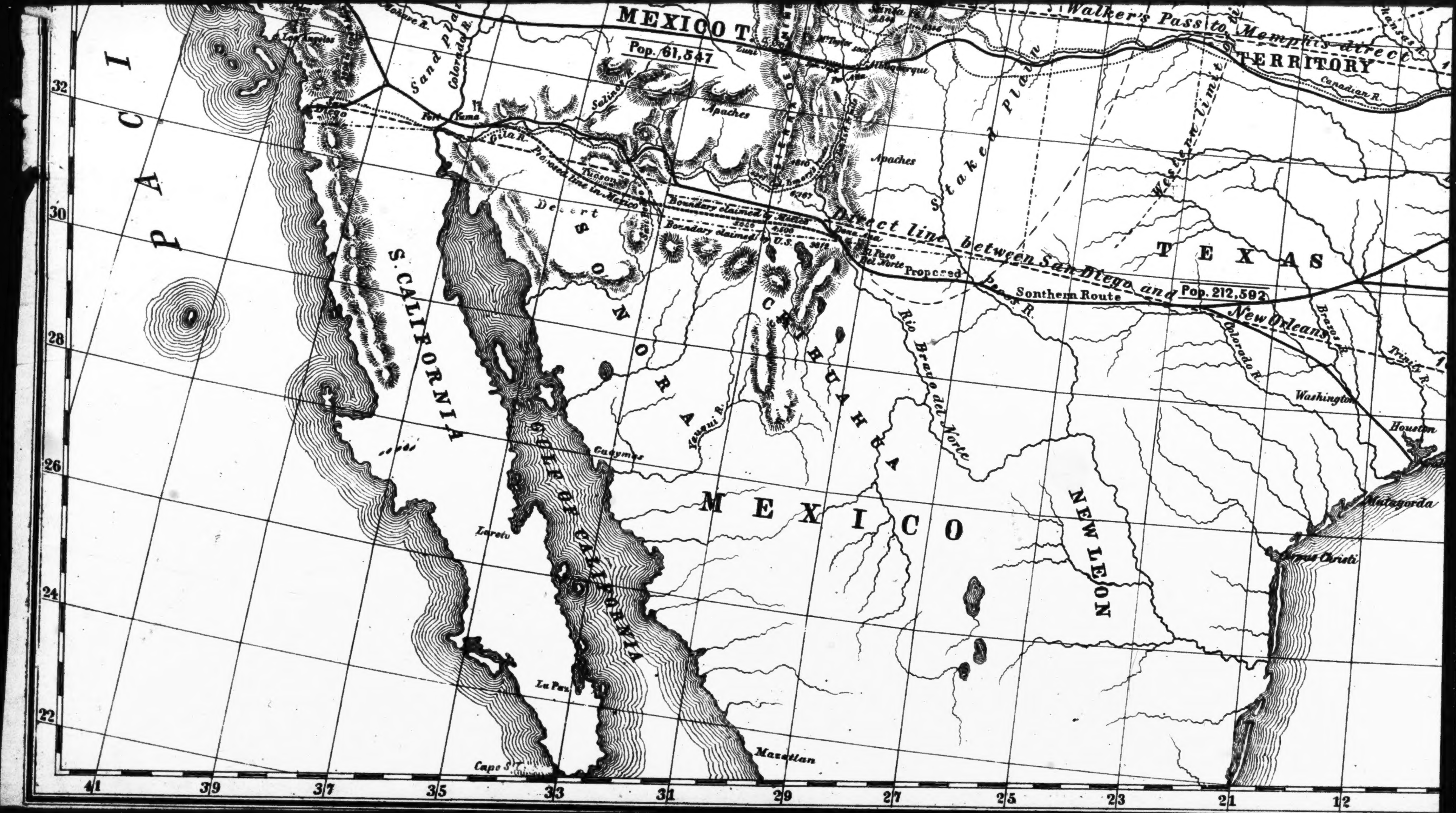
Map
OF THE


MEXICO TERRITORY
Pop. 61,547
Walker's Pass to Memphis direct
Santa Fe
Albuquerque
Zuni
Los Angeles
San Diego
Fort Yuma
Mohave R.
Colorado R.
Sand Plain
Salinas R.
Apaches
Gila R.
Proposed line in Mexico
Tucson
Desert
Boundary claimed by Mexico
Boundary claimed by U.S.
Dona Ana
El Paso Del Norte
Direct line between San Diego and New Orleans
Proposed
Southern Route
Staked Plain
Western limit
Canadian R.
TEXAS
Pop. 212,592
Pecos R.
Colorado R.
Brazos R.
Trinity R.
Washington
Houston
Matagorda
Corpus Christi
Rio Bravo del Norte
PACIFIC
S. CALIFORNIA
GULF OF CALIFORNIA
SONORA
CHIHUAHUA
Yaqui R.
Guaymas
Loreto
La Paz
Cape St. L.
Mazatlan
MEXICO
NEW LEON
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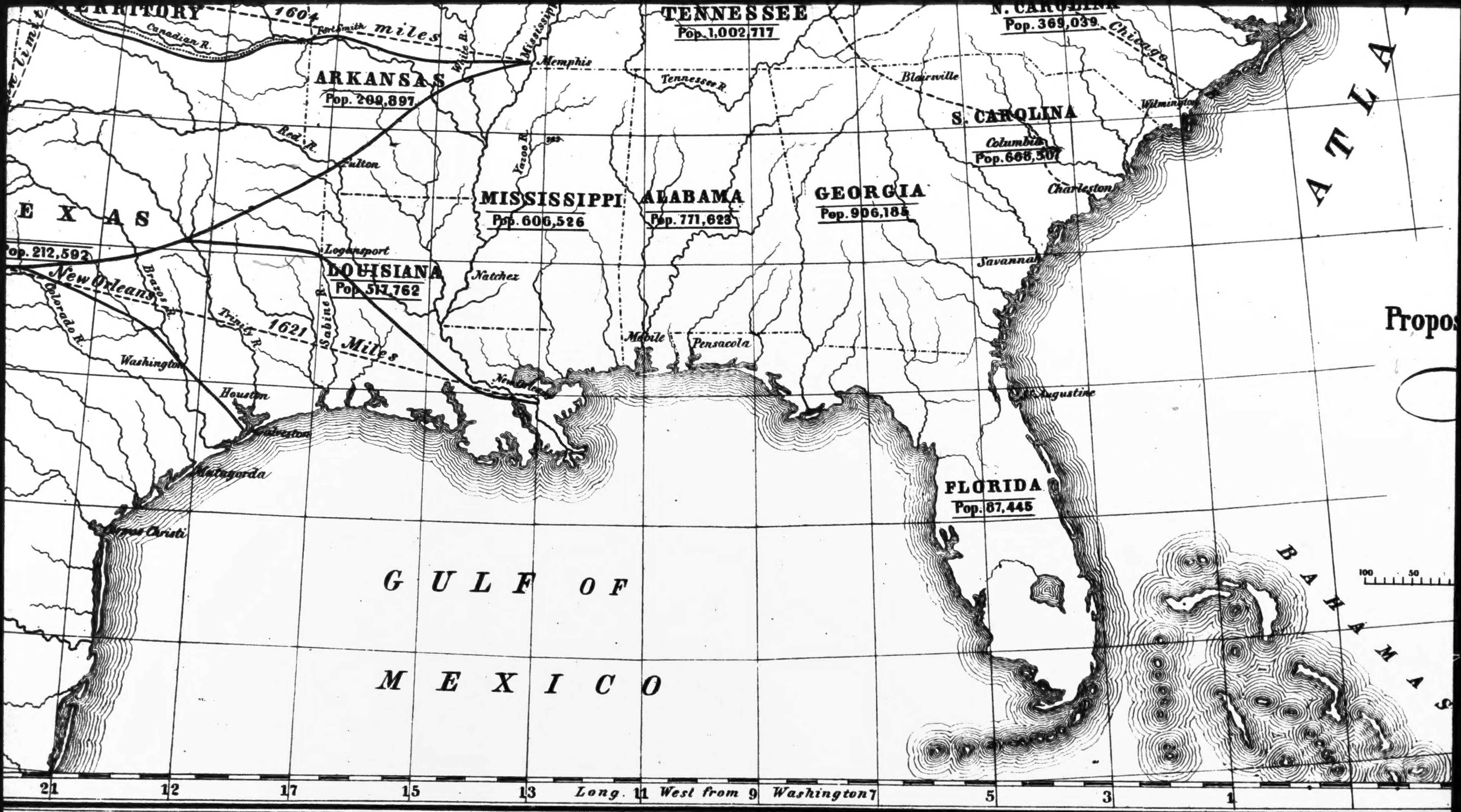
TERRITORY
1604 miles
Canadian R.
Fort Smith
White R.
Mississippi
Memphis
TENNESSEE
Pop. 1,002,717
N. CAROLINA
Pop. 369,039
Chicago
ATLA
Tennessee R.
Blairsville
Wilmington
ARKANSAS
Pop. 209,897
Red R.
Fulton
Yazoo R.
S. CAROLINA
Columbia
Pop. 668,507
Charleston
TEXAS
Pop. 212,592
MISSISSIPPI
Pop. 606,526
ALABAMA
Pop. 771,623
GEORGIA
Pop. 906,185
Logansport
LOUISIANA
Pop. 517,762
Natchez
Savannah
New Orleans
Brazos R.
Colorado R.
Trinity R.
Sabine R.
1621 Miles
Propos
Mobile
Pensacola
Washington
Houston
New Orleans
St. Augustine
Galveston
Matagorda
Corpus Christi
FLORIDA
Pop. 87,445
GULF OF MEXICO
BAHAMAS
100 50
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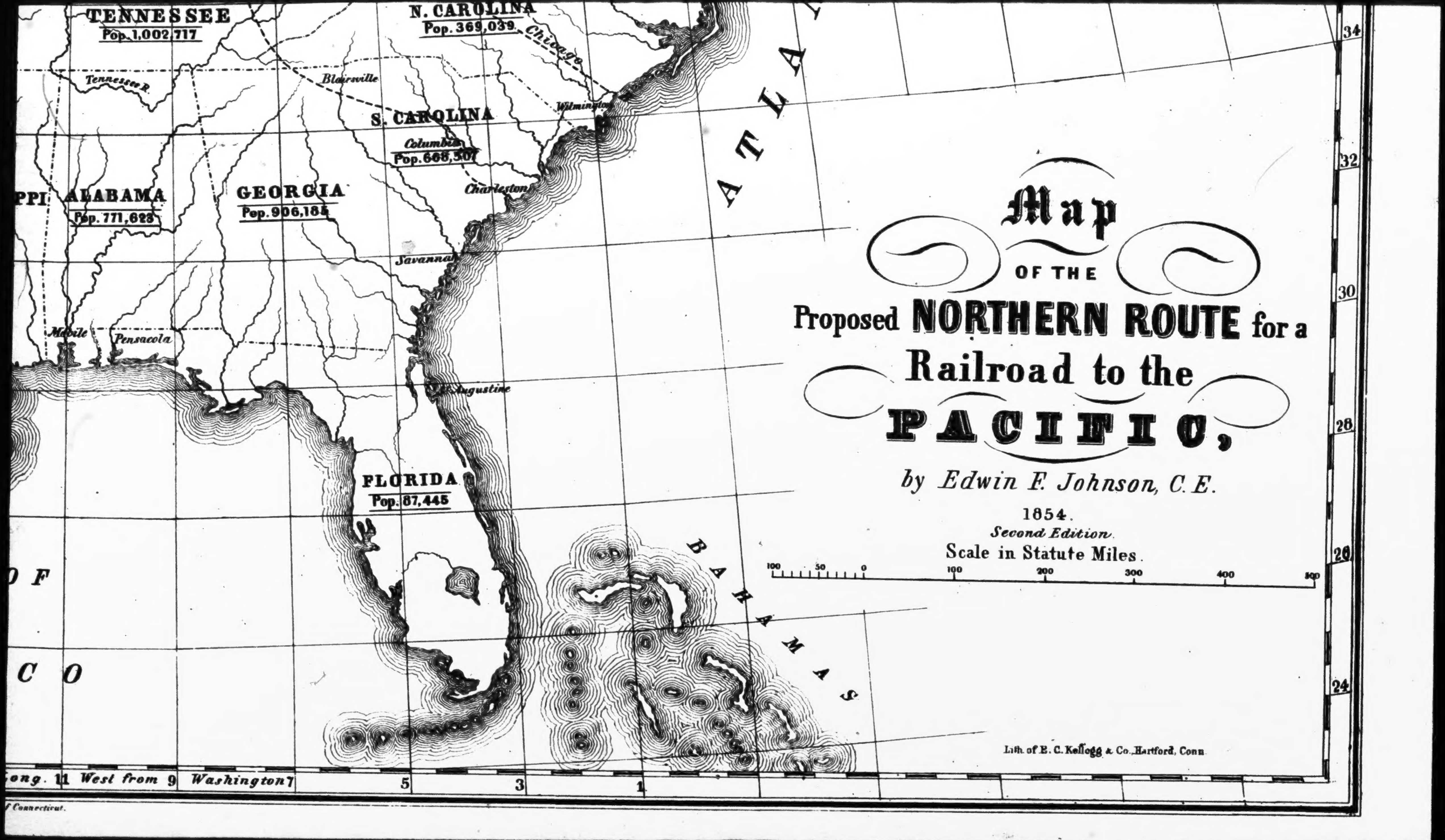

TENNESSEE
Pop. 1,002,717
N. CAROLINA
Pop. 369,039
Chicago
Tennessee R.
Blairsville
Wilmington
S. CAROLINA
Columbia
Pop. 668,507
Charleston
PPI
ALABAMA
Pop. 771,623
GEORGIA
Pop. 906,185
Savannah
Mobile
Pensacola
St. Augustine
FLORIDA
Pop. 87,445
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of Connecticut.

Map
OF THE
Proposed NORTHERN ROUTE for a Railroad to the PACIFIC,

by *Edwin F. Johnson, C.E.*

1854.

Second Edition.

Scale in Statute Miles.

Lith. of E. C. Kellogg & Co. Hartford, Conn.